GIANT TORTOISE

manual version 1.2

Contents

Giant Tortoise TOP PANEL

USB PORT
Calibration and firmware updates for BVS factory use only

POWER/FREQUENCY KNOB:
Is used to change selected transmitter parameters (frequency or power),the current parameter controlled by the knob is displayed on the last line of the main screen and selected using the main menu.

TX1 & TX2:
XMIT(Green)- Lit when the associated transmitter is on.
XMIT(Flashing Green)- Power adjusting to set level
UNLOCK(Red)- is lit if the associated transmitter has an RF problem - contact factory.

CONTRAST SLIDE CONTROL:
Adjusts the contrast of the LCD display.

AUDIO SPEAKER:
Outputs tones that indicate Giant Tortoise functions.

128 x 240 PIXEL LCD DISPLAY

KEYPAD:
1-9,0 are used for frequency and channel entry.

UP functions as an UP ARROW in menus.

DOWN functions as a DOWN ARROW in menus.

ENTER is used to initiate parameter entry in the main screen and to display unit information in the main menu.

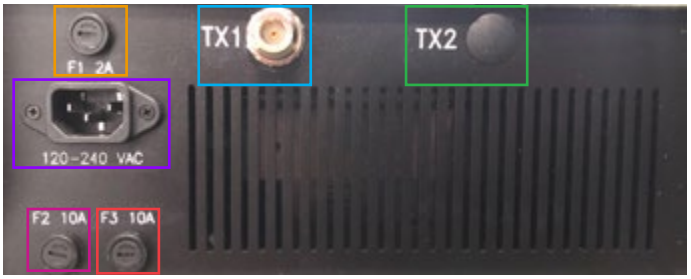
ESC is used to exit entry and to enter the main menu. It is also used to exit menus to return to the main screen.

TX1 is used to turn on and off transmitter 1.

TX2 is used to turn on and off transmitter 2.

MAIN POWER ON/OFF SWITCH

Giant Tortoise REAR PANEL



TX1 transmitter module 1 output
TX2 transmitter module 2 output
F1 user replaceable 2A fuse
F2 user replaceable 10A fuse
F3 user replaceable 10A fuse
120-240 VAC 120-240 VAC power input

CONTROL

All control and setting of operating parameters for the Giant Tortoise TRANSMITTER are accomplished using the top-panel keypad/knob combination. All valid parameters are saved by the Giant Tortoise and are the parameters used whenever the unit is powered up.

Giant Tortoise KEYPAD AND KNOB

The current Giant Tortoise parameter that can be modified by the keypad or knob is indicated by the marker shown on the left hand side of the Giant Tortoise main display. The UP and DOWN buttons can also be used to scroll within menu screens.

The ENTER button selects the currently chosen option while the ESC button backs out to previous screen.

STARTUP

This is the first screen you will see upon startup. It identifies the firmware version of your Giant Tortoise unit, TX 1 version, TX 2 version and serial number. This screen stays on about 10 seconds.

If you encounter any problems and need BVS technical support, be sure to write down these numbers before contacting support. You will be asked to provide these version numbers to help diagnose any problems.

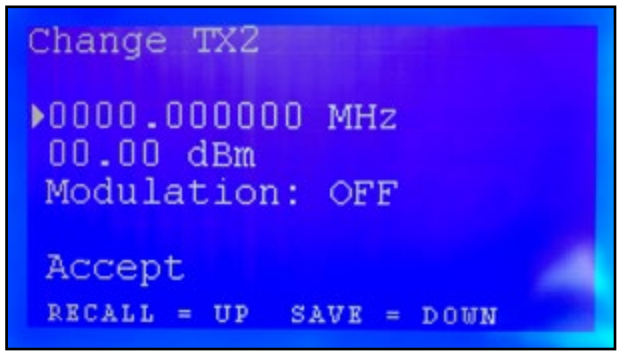
MAIN PARAMETERS

This screen displays and also allows control over all main parameters such as TX, frequency, power and modulation status so it is the MAIN display you will probably see most.

Note: Users will not be able to adjust any of these settings while the Giant Tortoise is actively transmitting any signal.

TX1 MHz indicates the current frequency setting of transmitter 1.
dBm indicates the current power output of transmitter 1.
MOD indicates if optional modulation is enabled if installed.

See Power Conversion at the end of this manual for dBm to Watts.



Use the KNOB or KEYPAD to scroll through menu and adjust changes.

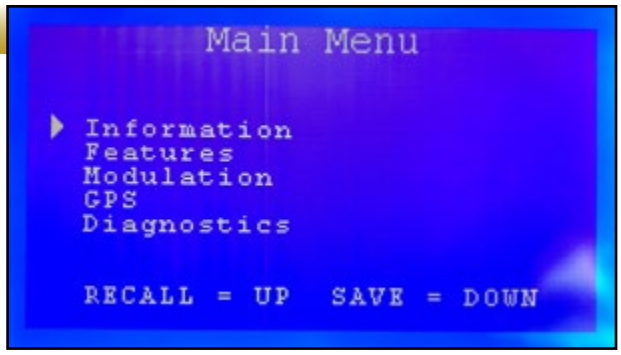
Select the TX output you wish to adjust and press ENTER. This brings you to the CHANGE screen allowing only adjustments for the selected TX. Use the UP button and DOWN button to choose the paramter to edit. Make changes using the KNOB or KEYPAD and choose ACCEPT by pressing the ENTER key.

When adjusting dBm or frequency, the step size will increase or decrease according to user setting in the SET & EDIT INCREMENTS menu screens.

Note: Once you finish settings, be sure that output(s) are properly terminated and/or antennas connected BEFORE starting transmission.

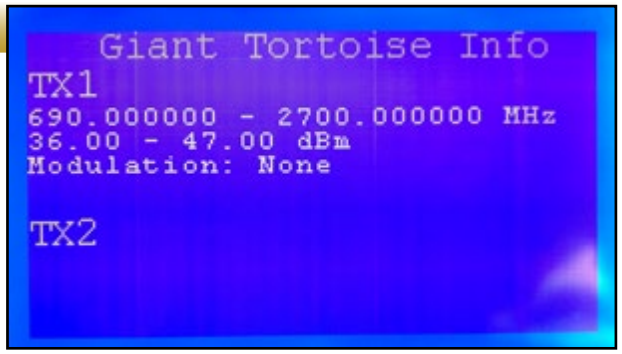
MAIN MENU

Press ESC to enter this MAIN MENU. Users may select and view Information, Features, Modulation, GPS and Diagnostics using the KEYPAD buttons UP and DOWN as arrow keys. Press ENTER to make a selection or ESC to go back to MAIN PARAMETERS screen.



INFORMATION

The INFORMATION screen displays the currently installed TX modules and their respective frequency ranges (MHz or GHz), power output ranges (in dBm) and optional modulation schemes (UMTS, LTE, CDMA, WiMAX, etc.)



FEATURES

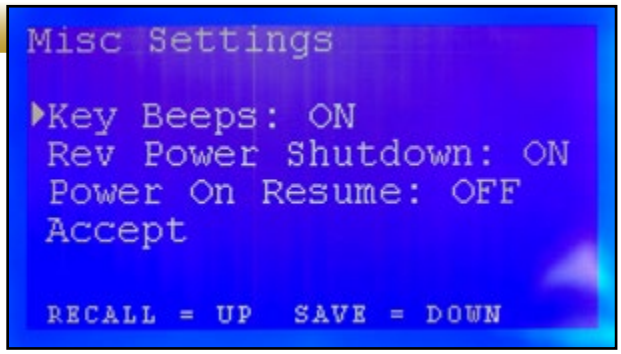
The FEATURES menu allows the user to set increments or step sizes in output frequency and power levels. Use the KEYPAD buttons UP and DOWN as arrow keys. Press ENTER to make a selection.

SET INCREMENTS

Within the SET INCREMENTS menu, choose your TX first. Use the KEYPAD buttons UP and DOWN as arrow keys. Press ENTER to make a selection.

Use the KNOB or KEYPAD buttons UP and DOWN as arrow keys to edit the increments. Once you have made the changes, scroll down to ACCEPT and press ENTER to make save settings.

MISC SETTINGS



MISC SETTINGS contains ON / OFF toggles for audible keypad "beeps", Rev Power Shutdown and Power On Resume.

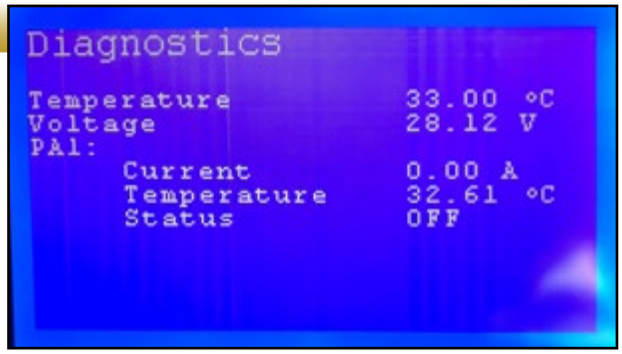
The Key Beeps are just audible indicators for keypad entry using the Giant Tortoise's built-in speaker.

Rev (Reverse) Power Shutdown monitors the power being reflected by the antenna. If it exceed a certain threshold, the power amplifier is shut down to protect it from overheating. The threshold can be exceeded if the Giant Tortoise is transmitting at high power into an unmatched load, such as a damaged (or missing) antenna. This setting is set to ON by default.

Note: Users should consult with BVS technical support before turning this setting OFF as it could damage the unit.

The Power On Resume toggle is for unexpected power outages. If either or both transmitters is ON when the unit loses power (or is manually turned off) and TX Resume is ON, the transmitter(s) that were on when power is restored will resume transmitting.

DIAGNOSTICS



The Giant Tortoise DIAGNOSTICS screen displays the current temperature, power (watts and amps) and ON / OFF status of each TX amplifier. Press ESC to return to the previous menu screen.

GPS DATA

Once the GPS receiver has synced to satellites, you should receive GPS details including date, time, satellites, status, latitude, longitude and height. The GPS receiver is optional so contact sales@bvsystems.com or call 732-548-3737 if you require GPS data.

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 vs. 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**

GENERAL 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.

GENERAL 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.

GENERAL 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.