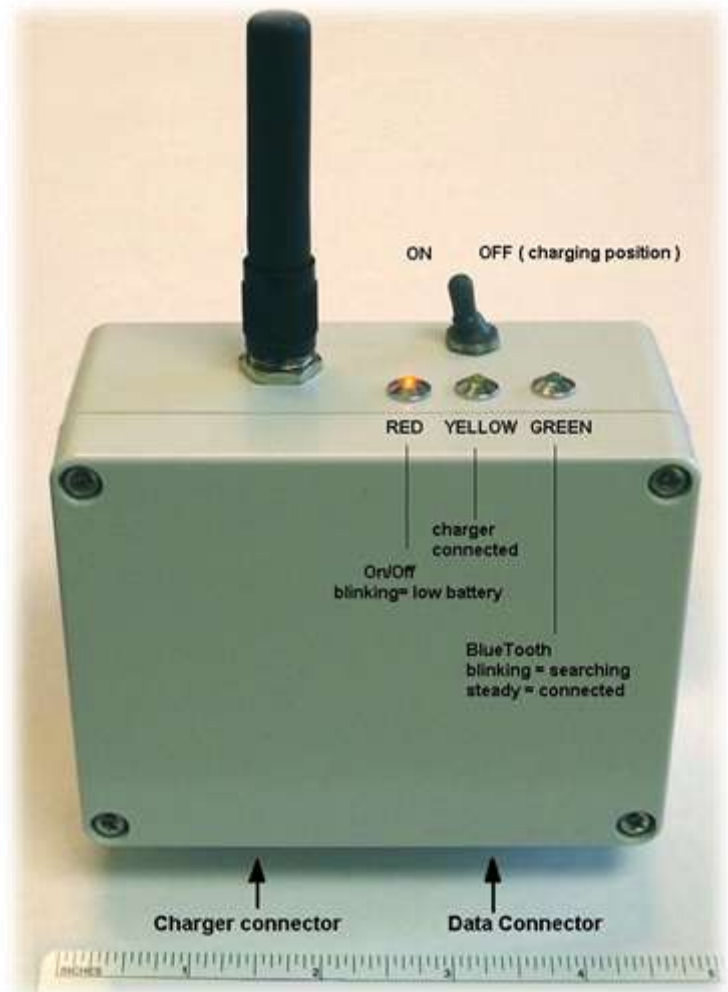


SATEL USA BLUETOOTH / UHF BRIDGE SETUP



METHOD OF OPERATION

After initial configuration, the Bluetooth Bridge is simply turned off / on using the toggle switch and charged in between uses. All settings saved during the initial configuration remain until changed.

SPECIFICATIONS

Specification	UHF Interface	Bluetooth Interface
Frequency Range	407 – 473 MHz	2.4 – 2.4835 GHz
Channel Spacing / Bandwidth	12.5kHz / 20kHz / 25kHz Programmable	1,600/sec, 1MHz fixed
Transmitter Power	100, 200, 500, 1000 mW	Max. +18 dBm (Class 1)
Receiver Sensitivity	-114dBm @12.5kHz, -111dBm @25kHz FEC ON	-86 dBm typical
Modulation	4FSK, GMSK (PacificCrest, TrimTalk)	GFSK-1 Mbps, DQPSK-2 Mbps, and 8-DPSK-3 Mbps
Range (Best Conditions)	<20 Kilometers	<100 Meters
Emission Type	F1D, Half Duplex	Bluetooth specification version 2.0+EDR Class 1
Data Transfer Speed [UHF]	19200 bps (25 kHz channel), 9600 bps (12.5 / 20 kHz channel)	
Data Delivery Speed[Bluetooth]	1 – 3 Mbps (Depending on Connection)	
Standards	EN 300 113 and CRF47 part90	

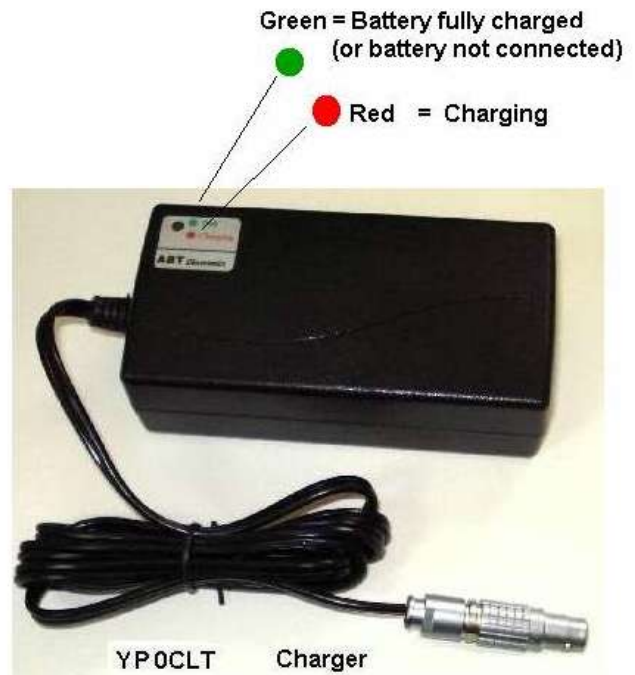
BATTERY

The Bluetooth / UHF Bridge is equipped with an internal Lithium Polymer battery which must be charged with a SATEL USA battery charger.

- Charging time is approximately 2 hours.
- Operating time is approximately 8 hours when receiving only, 2 hours when transmitting only. Actual operating time depends on duty cycle, power settings, and use.

USE ONLY THE SATEL USA BATTERY CHARGER. This charge is specifically designed to protect the battery and extend operating life.

ANY OTHER BATTERY CHARGER OR CHARGING METHOD MAY RESULT IN EXCESSIVE HEAT, FIRE, EXPLOSION, OR DAMAGE TO PEOPLE OR PROPERTY.



TYPICAL USE

1. Turn on Bluetooth Bridge
2. Locate the Bluetooth Bridge using 3rd party Bluetooth device
3. The Bluetooth Bridge is named "SATEL" with the last 4 digits of the serial number.
Example: "SATEL 1234"
4. Select and connect to the Bluetooth Bridge
5. No password is required
6. Data received from the UHF radio modem is sent transparently through the Bluetooth connection

SETUP & CONFIGURATION

The Bluetooth Bridge features two full-function wireless interfaces which are independently configured for their intended connection.

1. 407-473 MHz UHF Interface, 12.5/25 kHz selectable, compatible with SATEL, Pacific Crest, Trimble, Arwest and similar (matching signal settings are required)
2. Bluetooth Interface, v2.0+EDR Class 1

These interfaces are connected and share a programming adapter. There are separate setup procedures for each interface. Only the UHF interface requires initial setup before use.

ITEMS REQUIRED FOR CONFIGURATION (UHF AND BLUETOOTH)

A. SATEL USA Bluetooth / UHF Bridge with Internal Battery

Part number: YMBTU

B. Satel SaTerm Software

<http://www.satelusa.com/saterm>

C. BT / UHF Bridge Programming Adapter

Part number: YCBTNARL

D. Laptop computer with RS-232 serial port or Serial – USB adapter

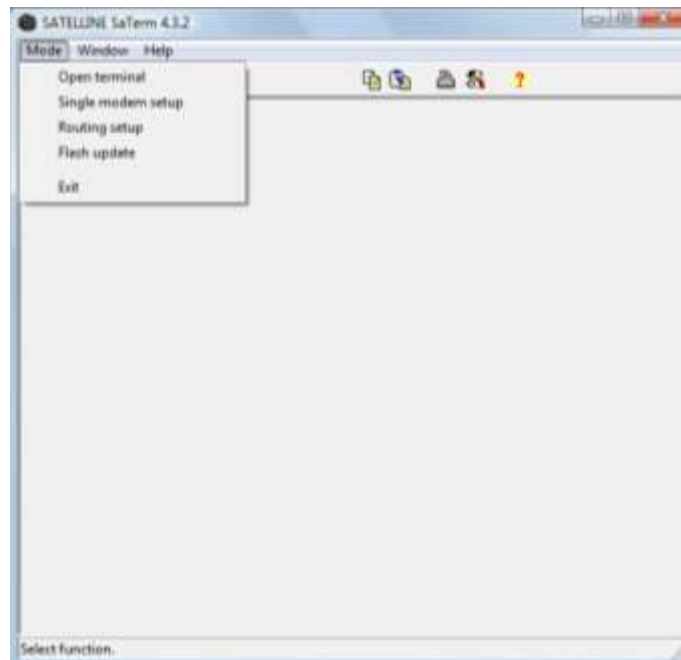


NORMAL OPERATION & CABLE CONNECTION

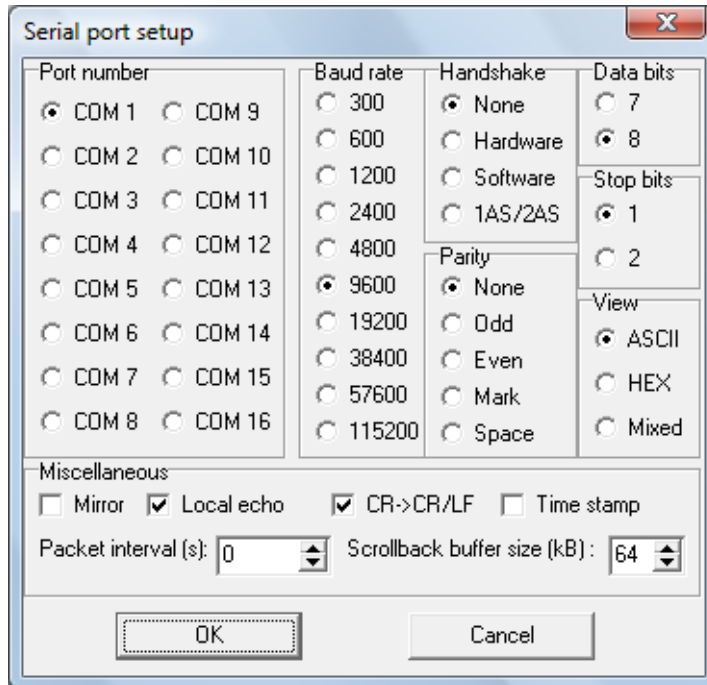
- In addition to transparently passing Bluetooth and UHF data back and forth between connected devices, changes may be made to the UHF interface during normal operation using “SL Commands” without the use of the programming adapter (Appendix B) over the Bluetooth connection.
- Configuration of the Bluetooth interface is not possible while the Bluetooth is connected over the air to any device.
- Neither the UHF nor Bluetooth interfaces are capable of transmission while in programming mode.
- The programming adapter may also be used to view the data, or as a serial interface for the Bluetooth / UHF Bridge.

INSTRUCTIONS FOR INITIAL UHF SETUP

1. Connect all Items
2. Turn on the Bluetooth / UHF Bridge
3. Open a terminal session in SaTerm



4. Programming settings for the UHF interface (shown below) are 9600 bps, 8 Start Bits, 1 Stop Bit, and No Parity



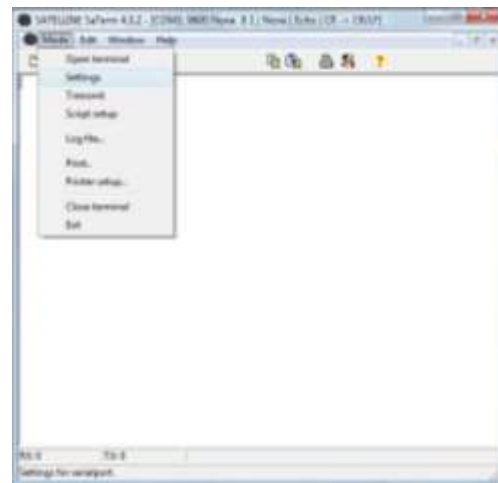
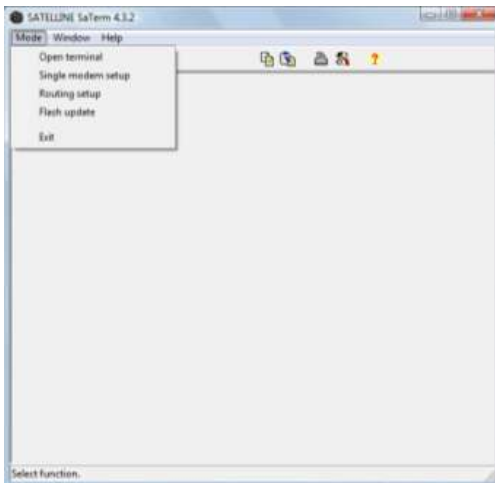
5. Flip the radio switch into programming mode
 - a. First, right switch UP
 - b. Then, left switch DOWN



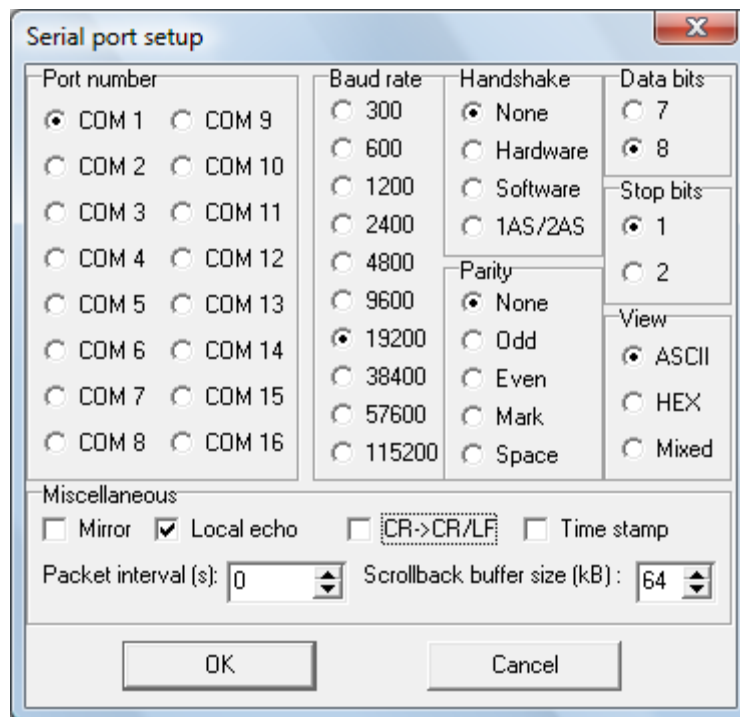
6. Follow on screen directions to assign the desired frequency and channel spacing.
7. Press "E" to exit and save the settings.
8. Return left switch to up position and disconnect the programming adapter.

BLUETOOTH CONFIGURATION

1. Open SaTerm and select “Open Terminal”, or if SaTerm is open select “Settings”



2. Programming settings for the Bluetooth interface (shown below) are 19200 bps, 8 Start Bits, 1 Stop Bit, and No Parity. Also disable the carriage return marked “CR -> CR/LF”. These are different than the UHF.



3. The switches are placed in the opposite configuration to program the Bluetooth module
 - a. Left switch UP
 - b. Right switch DOWN
4. Configuration is performed using “AT Commands” (Appendix A)

APPENDIX A: AT COMMANDS FOR BLUETOOTH INTERFACE

Below is a list of the primary AT Commands and their Function.

AT Commands are executed by entering the command followed by the <Enter> key. To set that the unit in programming mode and ready for configuration, type <AT> + <Enter>. Repeat if necessary until "OK" is received before sending any other command. The response should be "OK" for each correct command.

Command	Description
+++	When the device is in Data mode, it can be forced back into Command mode while maintaining the connection to the remote device. The sequence characters should be with a 1000ms guard time.
O	This command is used to enable/disable auto-connection feature. It is available only when the adaptor is in the master role.
O0 (default)	Automatically connect the adaptor to a device specified by ATD" or any available device if "ATD=xxxxxxxxxxx" is not executed. "
O1	Disable auto-connection feature. After it is executed, you need to execute ATA" to manually connect a remote device. "
O?	Inquire the current setting.
A	This command is used to establish a connection. It is available only when the Bluetooth is in the master role.
A	Connect the adaptor to a specified Bluetooth device. It is available only when ATD=xxxxxxxxxxx" is executed. "
A1-A8	Connect the adaptor to a Bluetooth device through ATF?" " in the neighborhood found
B	This command is used to display the Bluetooth address of the local adaptor.
B?	Inquire the Bluetooth address of the local adaptor.
D	For security purpose, this command is used to specify a unique remote Bluetooth serial adaptor to be connected. In the master role, the adaptor pairs and connects with the designated remote slave address. If the adaptor is in the slave mode, this command is a filter condition to accept the inquiry of the master device.
D=xxxxxxxxxxx	xxxx-xx-xxxxx" "is a string of 12 hexadecimal digits.
D0	Restore the status address in which the adaptor can connect with any remote
D?	Inquiry the designated address that can be paired and connected.
F	This command is used to search for any Bluetooth device in the neighborhood within one minute. If any device is found, its name and address will be listed. The search ends with a message Inquiry ends. xx device(s) found." This command is available only when the adaptor is in the master role. "
F?	Inquire Bluetooth devices in the neighborhood, listing 8 devices the maximum
H	This command is used to specify whether the adaptor can be discovered or connected by remote devices.
H0	The adaptor enters the undiscoverable mode. If a pair has been made, the original connection can be resumed. But other remote master device cannot discover this adaptor.
H1 (default)	The adaptor enters the discoverable mode.
H?	Inquire the current setting.
I	This command is used to inquire the firmware version.
I 0	Enquire the version codes.
I 1	List all current settings value

I ?	Enquire RSSI in Online Command Mode
N	This command is used to specify an alphanumeric name (spaces allowed) for the interface.
N=xxxxxx	xxxxxx" is a character string with a maximal length of 16. "
N?	Enquire the name of the local adaptor.
P	This command is used to specify a PIN. The default PIN is empty. Paired adaptors should have a same PIN.
P=xxxxxxx	xxxx is a 4~8-digit string.
P0	Cancel authentication by PIN.
P?	Enquire the current PIN.
R	This command is used to specify whether the adaptor is in the master or slave role. If the device role is changed, the adaptor will reboot and all paired addresses will be cleared.
R0	Set the adaptor to the master role.
R1 (default)	Set the adaptor to the slave role.
R?	Enquire the current role of the interface (master or slave).
Z	This command is used to restore the default settings and originate a warm start.
Z0	Restore the default settings.

APPENDIX B: SL COMMANDS FOR UHF INTERFACE

Below is a list of the primary SL Commands and their function. SL commands are entered in the same manner as AT Commands, by typing <SL> + <Enter>. The response should be "OK" for each correct command.

Command	Description
SL#A?	Show all addresses (RX1, RX2, TX1, TX2)
SL#A=xxxx, yyyy, zzzz, vvvv	Set RX/TX addresses (RX1, RX2, TX1, TX2)
SL#I?	Get primary addresses (TX1, RX1)
SL#I=xxxx	Set all addresses (RX1, RX2, TX1, TX2) to value xxxx [0000....ffff]
SL#P?	Get primary transmit address (TX1) and primary receive address (RX1)
SL#P=xxxx;yyyy	Set primary transmit address (TX1) to value xxxx and primary receive address (RX1) to value yyyy [0000....ffff]
SL#Q?	Get TX address mode
SL#Q=x	Set TX address ON/OFF. Values of x are: "0" = TX address OFF "1" = TX address ON
SL#R?	Get primary receive address (RX1)
SL#R=xxxx	Set receive addresses (RX1, RX2) to value xxxx [0000....ffff]
SL#S?	Get secondary transmit address (TX2) and secondary receive address (RX2)
SL#S=xxxx;yyyy	Set secondary transmit address (TX2) to value xxxx and secondary receive address (RX2) to value yyyy [0000....ffff]
SL#T?	Get primary transmit address (TX1)
SL#T=xxxx	Set transmit addresses (TX1, TX2) to value xxxx [0000....ffff]
SL#W?	Get RX address mode
SL#W=x	Set RX address ON/OFF. Values of x are: "0" = RX address OFF "1" = RX address ON
SLAxx	Set all addresses (RX1, RX2, TX1, TX2) to value xx [2 binary bytes] NOT RECOMMENDED for new systems
SLHnn	Set active frequency nn [0...99] channels above center frequency Frequency = Center frequency + nn*Channel spacing For conventional reasons, only 2 digit inputs are valid NOT RECOMMENDED for new systems
SLLnn	Set active frequency nn [0...99] channels below center frequency Frequency = Center frequency – nn*Channel spacing For conventional reasons, only 2 digit inputs are valid NOT RECOMMENDED for new systems
SLRxx	Set receive addresses (RX1, RX2) to value xx [2 binary bytes] NOT RECOMMENDED for new systems
SLTxx	Set transmit addresses (TX1, TX2) to value xx [2 binary bytes] NOT RECOMMENDED for new systems

SL!P?	Get channel number
SL!P=n	Set frequency to channel list frequency number n [0...number of channels in list]
SL\$A=1	Go to channel list default channel
SL\$D?	Get channel list default channel number
SL\$D=n	Set channel list default channel, n is channel number
SL\$E=1	Search free channel Modem searches for next traffic-free channel. Listening time of traffic is about 2 seconds Modem shows next free channel by activating command again
SL\$F?	Get active channel number
SL\$F=n	Set modem to channel number n in channel list
SL\$R?	Get listening time (seconds) of Search free channel function
SL\$R=n	Set listening time (seconds) of Search free channel function
SL\$S=1	Set channel scanning mode When activated, modem scans channels one by one and saves RSSI readings to memory
SL!B?	Get beacon interval (ms)
SL!B=n	Set beacon interval, n is decimal number (ms)
SL!C?	Get number of channels in FCS list
SL!C0	Clear number of channels in FCS list
SL!F?nn	Get frequency of FCS list channel nn (MHz)
SL!F=nnn.nnnnn	Add new frequency to FCS list (MHz) Note: Use SL!C0 to clear list before creating an updated frequency list!
SL!!?	Get FCS Net ID
SL!!=xxxx	Set FCS Net ID [0000...ffff]
SL!L?	Get channel hop threshold (dBm) i.e. RSSI trigger level for TX modem to change TX frequency Command is irrelevant in version 3.34 or later - adaptive channel hop scheme has replaced setting's function
SL!L=n	Set channel hop threshold (dBm) i.e. RSSI trigger level for TX modem to change TX frequency [-80...-118] Command is irrelevant in version 3.34 or later - adaptive channel hop scheme has replaced setting's function
SL!M?	Get FCS (Free Channel Scanning) mode
SL!M=x	Set FCS mode. Values of x are: "O" if FCS is turned OFF "M" for master (=transmitter) "S" for slave (=receiver). "E" for master with repeater in the system "R" for repeater "H" for slave with repeater in the system
SL!N?nn	Show last measured noise on channel nn (dBm) Note: This command applies only to FCS Master modem

SL!O?	Get beacon disable timeout (seconds)
SL!O= n	Set beacon disable timeout in seconds. If it is zero then beacon is never disabled. If timeout is less than beacon timeout, modem will not send additional beacons.
SL!R?	Get RX listen timeout (ms)
SL!R=n	Set RX listen timeout (ms)
SL!S?	Get beacon time (ms) i.e. time beacon is sent after channel change
SL!S=n	Set beacon time (ms) i.e. time beacon is sent after channel change
SL!T?	Get frequency RSSI measure time for TX modem (ms)
SL!T=n	Set frequency RSSI measure time for TX modem (ms)
SL!X?	Get current transmit frequency
SL**>	Save current settings as permanent settings
SL*R>	Restore settings to their factory set values
SLSOS	Save current settings as permanent settings
SL!H?	Get radio HW info
SL!V?	Get modem "type"
SL%C?	Get product number (or other customer info)
SL%D?	Get Modem Type
SL%H?	Get logic hardware version
SL%S?	Get Serial Number
SL%V?	Get firmware revision information
SL%P=1	Activate Programming menu (baud rate remains)
SL++?	Get status of reception control
SL+++	Disable reception
SL++O	Enable reception
SL+S=1	Activate sleep mode
SL&+=nnnn	Set active frequency nnnn channels above center frequency Frequency = Center frequency + nnnn*Channel spacing Value of nnnn is [0...number of channels/2] For conventional reasons, only 2 or 4 digit inputs are valid
SL&-=nnnn	Set active frequency nnnn channels below center frequency Frequency = Center frequency – nnnn*Channel spacing Value of nnnn is [0...number of channels/2] For conventional reasons, only 2 or 4 digit inputs are valid
SL&C?	Get center/reference frequency
SL&C=nnn.nnnnn	Set center/reference frequency
SL&D?	Get operational mode of radio.

SL&D=x	<p>Set operational mode of radio. Values of x are: "S" = Single channel: Rx and Tx frequencies are identical. "D" = Dual channel: Rx frequency = Tx Frequency - (lower limit of frequency band1 - lower limit of frequency band 2) "R" = Reverse dual channel: Tx frequency = Rx Frequency - (lower limit of frequency band1 - lower limit of frequency band 2) Command applies only if lower limits of frequency band 1 & 2 match Dual channel operation NOT RECOMMENDED for new systems - firmware variants with separate Rx/Tx frequencies provide better applicability</p>
SL&F?	Get active frequency
SL&F=nnn.nnnnn	Set active frequency to nnn.nnnnn MHz
SL&FR?	Get Rx frequency
SL&FR=nnn.nnnnn	Set Rx frequency to nnn.nnnnn MHz
SL&FT?	Get Tx frequency
SL&FT=nnn.nnnnn	Set Tx frequency to nnn.nnnnn MHz
SL&N?	Get active channel calculated from center frequency (= (active frequency – center frequency)/channel spacing)
SL&W?	Get channel spacing/channel width
SL&W=xxxx	<p>Set channel spacing. Value of xxxx is: "1250" for 12,5 kHz "2000" for 20 kHz "2500" for 25 kHz Command is supported only by hardware variants with adjustable channel spacing Before using this command, make sure that active frequency matches new channel spacing</p>
SL%F?	Get status of Error correction (FEC)
SL%F=x	<p>Set Error correction (FEC). Value of x is: "1" Set FEC ON "0" Set FEC OFF</p>
SL@D?	Get Tx delay (ms)
SL@D=n	Set Tx delay (ms), n is [0...65535]
SL@F?	Get noise level of radio channel
SL@M?	Get repeater function
SL@M=x	<p>Set repeater function. Values of x are: "0" = Repeater function OFF "R" = Repeater function ON</p>
SL@P?	Get transmitter output power
SL@P=nnnnn	<p>Set RF output power (mW) For example "SL@P=100" sets 100 mW transmitter output power. Output power is rounded if given value does not match preset power levels. Apart from other compilations, VAR2 accepts also "SL@P=#n" format commands, where n [1...7] is the number of the memory location that stores the value for the wanted power level.</p>

SL@R?	Get RSSI (Received Signal Strength Indication) of last received message (dBm)
SL@S?	Get radio compatibility mode
SL@S=x	Set radio compatibility mode. Value of x is: 0 = Satel 3AS 1 = Option 1 (PacCrest 4-FSK) 2 = Option 2 (PacCrest GMSK) 3 = Option 3 (TrimTalk GMSK)
SL@T?	Get current signal threshold (dBm)
SL@T=-nnn	Set minimum power level of signal to be received (=Signal Threshold level) Value of nnn is decimal value [80...118] in dBm
SL@X=9	Reset command. Resets modem
SL+C?	Get modem temperature in Celcius degrees
SL+P=xxxx	Get measured signal strength from remote modem i.e. SL "ping" Value of xxxx [0000...ffff] defines address of remote modem
SL+T?	Get status of Transmitter tests
SL+T=x	Activate/Stop transmitter test. Value of x is: "0" = Stop any transmitter test "1" = Transmit Carrier test "2" = Transmit Deviation test
SL+W=xxx,n	Set transmitter output power level xxx [000...255] in memory location n [1...7] 0 sets the maximum power and 255 sets the minimum power

APPENDIX C: DEFAULT UHF SETTINGS

1. Radio frequency 463.00000 MHz (CF 438.00000 MHz, spacing 25 kHz)
2. Radio settings:
 - TX power 1000 mW
 - Signal threshold -115 dBm
 - FCS OFF
 - TX start delay 0ms
 - Diversity RX OFF
 - EPIC PWRSave OFF
 - Compatibility Satel 3AS
3. Addressing
 - RX address OFF
 - TX address OFF
 - RX address to RS port OFF
 - TX address autoswitch OFF
4. Serial port 1:
 - ON
 - 19200 bit/s
 - 8 bit data
 - None parity
 - 1 stop bit
5. Serial port 2:
 - OFF
 - 9600 bit/s
 - 8 bit data
 - None parity
 - 1 stop bit (LVTTTL)
6. Handshaking:
 - CTS Clear to send
 - CD RSSI-
 - RTS Ignored
 - Pause length 3 bytes
7. Additional setup:
 - Error correction OFF
 - Error check OFF
 - Repeater OFF
 - SL-commands ON
 - Priority TX
 - Full CRC16 check OFF
8. Routing OFF
9. Tests OFF

APPENDIX D: DEFAULT BLUETOOTH SETTINGS

1. ATC=1, HARDWARE FLOW CONTROL
2. ATD=0000-00-000000, NEVER SET BLUETOOTH ADDRESS
3. ATE=1, ECHO CHARACTERS
4. ATG=1, ENABLE ALL PAGE AND INQUIRY SCAN
5. ATH=1, DISCOVERABLE
6. ATK=0, ONE STOP BIT
7. ATL=2, BAUD RATE is 19200
8. ATM=0, NONE PARITY_BIT
9. ATN=Satel xxxx, LOCAL NAME
10. ATO=0, ENABLE AUTO CONNECTING
11. ATP=NNNN, PIN CODE
12. ATQ=0, SEND RESULT CODE
13. ATR=1, SPP SLAVE ROLE
14. ATS=1, ENABLE AUTO-POWERDOWN OF RS232 DRIVER
15. ATX=1, ALWAYS CHECK '+++'