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THANK YOU FOR YOUR PURCHASE OF THE UV-2501+220. THIS DUAL BAND RADIO WILL DELIVER TO YOU SECURE INSTANT RELIABLE COMMUNICATION.

PLEASE READ THIS MANUAL CAREFULLY BEFORE USE

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Part I. Getting started

Part one covers the basic setup and use of your mobile two-way transceiver.

CHAPTER 1 GETTING STARTED
CHAPTER 2 BASIC USE
CHAPTER 3. – MENU QUICK REVIEW
CHAPTER 4. – PROGRAMMING
CHAPTER 5. – OTHER SETTINGS

Chapter 1. – Getting Started

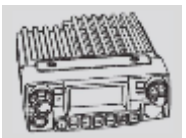
BEFORE PROCEEDING INSURE:

- Qualified technicians shall service this equipment only. Do not modify the radio for any reason.
- Use only BTECH supplied or approved accessories.
- **Turn off your radio prior to entering any area with explosive and flammable materials. Do NOT USE your transceiver at a gas/fuel station**
- For vehicles with an air bag, do not mount your radio in the area over an air bag or in the air bag deployment area.
- Do not expose the radio to direct sunlight over a long time, nor place it close to a heating source.
- If the unit emits smoke or an odor, you should immediately cut off the power supply. Then send the radio to the nearest service center or dealer
- Do not operate the mobile transceiver on high power unless it is necessary. Do not transmit for long periods of time, as it may overheat the transceiver.
- Keep the unit away from dusty, damp and wet environments
- Use the correct power supply (~13.8V); do not use incorrect or higher voltage (e.g. 24V)

Unpacking and Inspecting

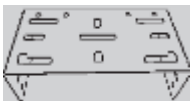
- Please check the packaging of your radio for any signs of damage.
- Carefully open the box, and confirm your received the items listed below.
- If you find the radio or the included accessories are damaged or lost, immediately contact your dealer.

What's in the Box



UV-2501+220 Pictured
Mobile Radio

Microphone



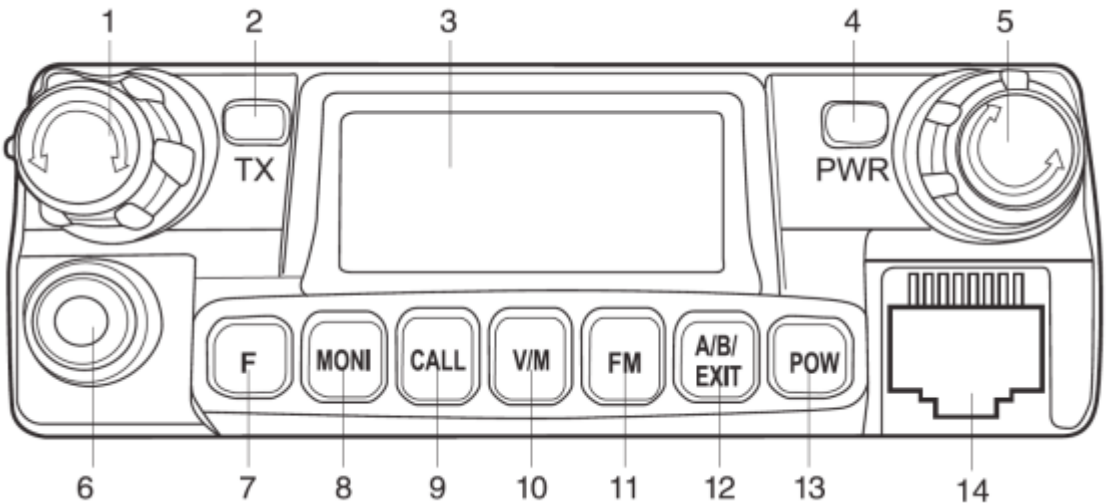
Mounting Bracket

Power Cable

Mounting Screws and Fuse

Overview of the Transceiver

UV-2501+220 Pictured



1. Selector, Main Knob
2. Transmit indicator
3. Display screen
4. Power Indicator
5. Volume Knob
6. PC port *(Do Not Confuse with the Line-Out Jack located in the back)*
7. Function key
8. Monitor key
9. Call key
10. VFO/Memory key
11. FM Radio key
12. Exit & A/B Channel Switch & Alarm Key
13. Power key
14. Microphone Connector
15. **Audio Out – *Backside***

F: click to enter the function menu

CALL: when in standby, press to send caller ID (ANI) in the selected signaling mode; while transmitting, press to send activate signaling.

MONI: press to turn on the squelch, repeat to turn off the squelch.

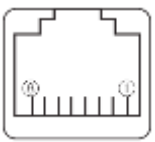
⏻: hold the key to turn radio power On or Off.

V/M: press to switch between channel mode and frequency mode.

EXIT/A/B: press to choose between A and B frequencies --- Or exit function mode.

FM: press to enter and exit FM radio

RJ45 Connector:



① Data Input
② Null
③ MIC
④ MIC Ground
⑤ PTT.
⑥ GND
⑦ +8V DC Out
⑧ Null

Hand Held Mic Function Keys and Description

1 “MENU”: Function key
VFO/MR Toggle (Long Press)
2 “UP”: Higher frequency
3 “DOWN”: Lower frequency
4 “EXIT”: Exit the AB channel switch, alarm function
5 “*/SCAN”: Scanning function
6 “#/LOCK”: Keyboard lock (Hold Key)
H/L Power Toggle (Short Press)
7 “0”: Number 0
8 “1”: Number 1
9 “2”: Number 2
10 “3”: Number 3
11 “4”: Number 4
12 “5”: Number 5
13 “6”: Number 6
14 “7”: Number 7
15 “8”: Number 7
16 “9”: Number 9

The main display

UV-2501+220 Display**

Icon	Description	Icon	Description
188	Memory channel	R	Reverse function enabled
25, 75	Least significant modifiers.	N	Narrowband enabled
CT	CTCSS enabled		Full Voltage indicator
DCS	DCS enabled		Keypad lock enabled
+ -	Frequency shift enabled (Repeater	H, L	Transmit power level indicator According to Power (High, Low)
FM	FM Radio Active	➔	Indicates active band or channel
TDR	Dual watch enabled		Signal Strength Indication
PRI	Priority Scan Enabled		
T	Optional Signaling Enabled (2Tone, 5Tone, DTMF)		***Not All Icons are Used*

Chapter 2. – Basic Shortcuts and Use

Pound # Key

Keypad Lock

To enable or disable the keypad lock, press and hold the [#] key for about two seconds.

A quick toggle of the # will alternate power levels from High power to Low power

The keypad lock will lock both the main radio buttons itself and also the handheld key pad.

The PTT/MONI/and Power Buttons will not be locked when enabled.

Star * Key

A short momentary press of the key enables the reverse function (reverses the TX/RX settings according to Offset settings) – ***This will not work if you have the Dual watch enabled (TDR is set to On (Menu 0))***

When listening to broadcast FM a momentary press will start the scanning. Scanning in broadcast FM will stop as soon as an active station is found

To enable scanning, press and hold the (*SCN) key for about two seconds

Turning the unit on

To turn the unit on, simply hold the power button until it turns on. If your radio powers on correctly there should be an audible tone after about one second and the display will show a message or flash the LCD depending on settings for about one second.

Turning the unit off

To turn the unit off, simply hold the power button until it turns off. The unit is now off.

Adjusting the volume

To turn up the volume, turn the volume knob clock-wise.
To turn the volume down, turn the volume/power knob counter-clock-wise.

By using the monitor function (MONI button), you can more easily adjust your volume by adjusting it to the un-squelched static.

Making a call

Press and hold the PTT button on the side of the handheld mic to transmit. While transmitting, speak approximately 3-5cm from the microphone. When you release the PTT your transceiver will go back to its receive mode.

VFO/MR Toggle

You can toggle from VFO and MR (Memory Recall) mode by either pressing the V/M button on the front of the UV-2501+220, or you can toggle by a long press of the 'Menu' button from the DTMF Microphone.

Chapter 3. – Menu Quick Review

Quick Menu Settings

(Full Definitions in Appendix A)

To set the Menu options from the Mobile body use the 'F' key to select and confirm the changes, while the knob will change your settings. To set the Menu options from the Mobile Microphone use the 'Menu' key to select and confirm the changes, while the knob will change your settings.

0. **[F Key] + [0]** : TDR – ON, This allows you to monitor both A/B frequencies at the same time (dual watch). When it is off, only the selected A or B frequency is monitored.
1. **[F Key] + [1]** : STEP – set the frequency increments step in VFO mode: 2.5kHz, 5kHz, 6.25kHz, 10kHz, 12.5kHz, 25kHz selectable.
2. **[F Key] + [2]** : SQL – Sets the receiver squelch level: 0 is OFF, 1 is the lowest setting through 9 which is the highest setting.
3. **[F Key] + [3]** : TXP – Sets the transmit power setting from HIGH to LOW.
4. **[F Key] + [4]** : SCR - Scrambler setting. This activates the voice scrambling feature, which will invert/reverse the audio being transmitted and received, it is programmable on a per channel or VFO basis.

5. **[F Key] + [5]** : TOT - transmission time-out timer. Sets the maximum transmit time from 15 to 600 seconds (15 second steps).
6. **[F Key] + [6]** : APO – Auto Power Off powers off the radio after a predetermined time with no receiver activity. (30 > 300 minutes)
7. **[F Key] + [7]** : WN - WIDE or NARROW band width settings (12.5/25khz).
8. **[F Key] + [8]** : ABR - LCD backlight time setting. OFF / 1-50 seconds.
9. **[F Key] + [9]** : BEEP - turns key beeps OFF or ON.
10. **[F Key] + [1] + [0]** : R-DCS - DCS receive/squelch settings. Options include the D023N-D754N positive sequence and the D023I- D754I reversed sequence.
11. **[F Key] + [1] + [1]** : R-CTCS - CTCSS receive/squelch settings. Selectable from 67.0HZ-254.1HZ. you can use the keypad to quickly enter in the desired setting
12. **[F Key] + [1] + [2]** : T-DCS - DCS transmit settings. Options include the D023N-D754N positive sequence and the D023I- D754I reversed sequence.
13. **[F Key] + [1] + [3]** : T-CTCS CTCSS transmit settings. Selectable from 67.0HZ-254.1HZ. you can use the keypad to quickly enter in the desired setting
14. **[F Key] + [1] + [4]** : DTMFST – DTMF transmit tone settings.
    OFF: No tones heard through the speaker when transmitting. **KEY**: Only manually keyed DTMF codes are heard. **ANI**: Only automatically keyed DTMF codes are heard. **BOTH**: All DTMF codes are heard.
15. **[F Key] + [1] + [5]** : BCL - busy channel lock- out. If you have this turned on the transmitter will not transmit if a channel is receiving at the time

16. **[F Key] + [1] + [6]** : SC-ADD - scan settings. OFF: This removes the channel from the scan list. ON: This adds the channel to scanning list.
17. **[F Key] + [1] + [7]** : PRI-SC - priority scan setting. When this is enable the priority scanning option will be turned on – ***use this setting in conjunction with Menu 18***.
18. **[F Key] + [1] + [8]** : PRI-CH - priority channel scan setting. Select the channel that will be prioritized in all modes, the channel that is selected will be scanned about 4 seconds
19. **[F Key] + [1] + [9]** : SC-REV – Scanning settings. TO: time out scan, after the stopping on an active signal, scanning will resume after a few seconds. CO: Scanning will stop on a carrier channel and will resume after the carrier channel stops receiving SE: Scanning will stop once an active carrier channel is found.
20. **[F Key] + [2] + [0]** : OPTSIG – Turn on the optional signaling. OFF the channel or mode will not use optional signaling DTMF: DTMF signaling required. 2TONE: 2 tone signaling required. 5TONE: 5 tone signaling required. (PC programming is required to specify the DTMF, 2Tone, and 5Tone settings)
21. **[F Key] + [2] + [1]** : SPMUTE – Squelch settings when combining standard and optional tones. QT: The squelch will open for just a CTCSS or DCS Receive tone. AND: This requires both the optional tone settings (Menu 20) and CTCSS/DCS settings to be received. OR: If a either the DCS/CTCSS or optional signaling is received the squelch will open
22. **[F Key] + [2] + [2]** : PTT-ID - PTT-ID transmit setting. OFF: no ID code sent when transmitting. BOT: send ID code at Beginning of Transmit. EOT: send ID code at End of Transmit. BOTH: send ID code at both beginning and end of transmit. (PTTID code

information can only be set by the PC software)

23. **[F Key] + [2] + [3]** : PTT-LT - PTT-ID transmit delay setting. (Delay Time range is 0-30 seconds.). This is the delay time before transmitting the PTTID
24. **[F Key] + [2] + [4]** : S-INFO - Signal information and automatic dialing memory. 1-15 group signal code/decode memory. The memory list is programmed through software.
25. **[F Key] + [2] + [5]** : EMC-TP - alarm mode settings. ALARM: turns on the alarm sound on the device itself. ANI: Sends the Alarm and PTTID through the Transmitter. BOTH: combines both of the options above.
26. **[F Key] + [2] + [6]** : EMC-CH - alarm channel setting. This is the channel that the alarm will transmit the PTTID and Alarm sound on
27. **[F Key] + [2] + [7]** : RING-T - Ring time setting (Pager sound for optional signaling channels). OFF: pager sound is disabled, or from Choose 1-10 seconds to set the ring time on the pager when the radio optional signaling code is received.
28. **[F Key] + [2] + [8]** : CHNAME - channel name edit.
29. **[F Key] + [2] + [9]** : CA-MDF - Display Mode (upper) - FREQ: displays Frequency. CH: displays channel number. NAME: displays assigned channel name.
30. **[F Key] + [3] + [0]** : CB-MDF - Display Mode (lower) - FREQ: displays Frequency. CH: displays channel number. NAME: displays assigned channel name.
31. **[F Key] + [3] + [1]** : SYNC – When this is ON, the upper and lower displays are synced to the same channel. (use in conjunction with Menu 29 and 30 to display the channel name and frequency simultaneously)

32. **[F Key] + [3] + [2]** : PONMSG - PowerOn message. Display mode setting. FULL: All the display icons illuminate when you turn on the radio (screen test). MSG: displays the PC set PowerOn message. BATT-V displays battery voltage at PowerOn.
33. **[F Key] + [3] + [3]** : WT-LED - standby backlight setting. OFF: no backlight. Color options are BLUE, ORANGE and PURPLE.
34. **[F Key] + [3] + [4]** : RX-LED - receive backlight setting. OFF: no backlight. Color options are BLUE, ORANGE and PURPLE.
35. **[F Key] + [3] + [5]** : TX-LED - transmit backlight setting. OFF: no backlight. Color options are BLUE, ORANGE and PURPLE.
36. **[F Key] + [3] + [6]** : MEM-CH - saves the selected channel.
37. **[F Key}+ [3] + [7]** : DEL-CH - deletes the selected channel
38. **[F Key] + [3] + [8]** : SFT-D - Frequency difference direction setting. OFF: no frequency difference. (**+)**: Transmit offset amount will be a positive offset (higher than the receive frequency). (**-**): Transmit offset will be a negative offset (amount will be lower than the receive frequency).
39. **[F Key] + [3] + [9]** : OFFSET - difference between the transmit and receive frequency.
40. **[F Key] + [4] + [0]** : ANI – Displays the radio ID code. Code only can set by PC software.
41. **[F Key] + [4] + [1]** : ANI-L - ID code length. Length = 3, 4, 5.
42. **[F Key] + [4] + [2]** : REP-S – Tone burst repeater settings. Pressing CALL will send a predetermined tone. Options are 1000 Hz, 1450 Hz, 1750 Hz, 2100 Hz.
43. **[F Key] + [4] + [3]** : REP-M - repeater forwarding mode setting. Used in conjunction with

two radios connected as a repeater. **OFF**: turned off. **CARRI**: forwards after it receives a carrier call. **CTDCS**: forwards after it receives correct CT/DCS tone **TONE**: forwards after it receives the correct 2Tone or 5Tone. **DTMF**: forwards after it receives the assigned DTMF code.

44. **[F Key] + [4] + [4]** : TDR-AB – Transmit Delay Return time. Delay time before returning to the primary channel after the secondary signal is clear. (PTT Return Time)
45. **[F Key] + [4] + [5]** : STE - Squelch Tail Elimination at the end of a received signal. Requires both transmitting radios to have the option ON.
46. **[F Key] + [4] + [6]** : RP-STE - Repeater Squelch Tail Elimination requires a repeater with this function ON. (Reverses the CT/DCS settings at the end of a transmission to quickly turn of the squelch)
47. **[F Key] + [4] + [7]** : RPT-DL – Repeater Squelch Tail Eliminator Delay time. (use with Menu 46)
48. **[F Key] + [4] + [8]** : M-GAIN – Adjust the gain the the Microphone. Selectable from 0-127. 0 being the quietest level and 127 being the loudest modulated microphone audio.
49. **[F Key] + [4] + [9]** : DTMF-G – Adjust the gain of the DTMF tones. Selectable from 0-60. 0 being the quietest level and 60 being the loudest modulated DTMF tones.
50. **[F Key] + [5] + [0]** : RESET – Reset all VFO settings or ALL settings (channels deleted and VFO settings cleared)

Chapter 4. – Programming

Frequency Mode vs. Channel Mode

Switch between Modes by Using the V/M Front Panel Button

These two modes have different functions and are often confused.

Frequency Mode (VFO) - Used for a temporary frequency assignment, such as a test frequency or quick field programming if permitted.
Channel Mode (MR) - Used for selecting preprogrammed channels.

ALL PROGRAMMING MUST BE INITIALLY DONE IN THE FREQUENCY MODE (VFO) ONLY. FROM THERE YOU HAVE THE OPTION OF ASSIGNING THE ENTERED DATA TO A SPECIFIC CHANNEL FOR ACCESS IN THE CHANNEL MODE. ONCE YOU PROGRAM A CHANNEL YOU CANNOT CHANGE THE SETTINGS, BUT YOU CAN

PROGRAMMING CHANNELS ARE DIFFERENT FROM THE VFO SETTINGS; THE OFFSET SETTINGS ARE NOT STORED, INSTEAD YOU ENTER A TX FREQUENCY DIRECTLY (E.G. 145.000 RX WITH AN OFFSET OF (+) .600 WOULD BE A TX FREQUENCY OF 145.600).

Ex: Programming a Channel Repeater Offset with CTCSS Tone

EXAMPLE New memory in Channel 99:

RX = 145.000 MHz

TX = 145.600 MHz (This is a (+ .600) Offset)

TX CTCSS tone 123.0

1. Change from Menu to Menu by pressing the [EXIT/AB] button.
2. Set radio to VFO Mode by pressing [V/M]
   Channel number at the right will disappear.
3. Menu 37 [M] 9 9 [M] [EXIT] **Deletes Prior Data in channel *(Ex. 99)***
4. Menu 13 [M] 123.0 [M] [EXIT] **Selects desired TX encode tone**
5. **Enter RX frequency *(Ex. 145000)***
6. Menu 36 [M] 9 9 [M] **Enter the desired channel *(Ex 99)***
   - [EXIT] **RX has been added**
7. **Enter TX frequency *(Ex. 145600)***
8. Menu 36 [M] 9 9 **Enter the same channel *(Ex 99)***
   - [EXIT] **TX has been added**
9. [V/M] Return to MR Mode. **Channel number will re-appear.**

Ex. Programming a Simplex Channel with CTCSS tone

EXAMPLE New memory in Channel 99:

RX = 446.000 MHz

TX CTCSS tone 123.0

1. Change from Menu to Menu by pressing the [EXIT/AB] button.
2. Set radio to VFO Mode by pressing [V/M]
   Channel number at the right will disappear.
3. Menu 37 [M] 9 9 [M] [EXIT] **Delete Prior Data in channel *(Ex. 99)***
4. Menu 13 [M] 123.0 [M] [EXIT] **Select desired TX encode tone *(Ex 123 CTCSS)***
   - Use [A/B] to select Upper display -> **Enter RX frequency *(Ex. 446000)***
5. Menu 36 [M] 9 9 [M] **Enter the desired channel *(Ex 99)***
   - [EXIT] **Channel has been added**
6. [V/M] Return to MR Mode. **Channel number will re-appear.**

Chapter 5. – Other Settings

Toggle from High to Low Power

A quick press of the Microphone '#' will alternate power levels from High power to Low power

Storing an FM Radio Station and Scanning

Use PC software to store FM radio channels names , you can name the FM channel and instead of display the frequency your FM station will display the name . (*software* FM option (FM channels are not stored, only the channel names are)) Press the microphone [*] Key to scan the FM radio.

Keypad Lock-out

Hold the microphone [# key] for 2 seconds at standby to turn on/off the keypad lock-out function. (The Lock icon appears, when the radio is locked out)

PTT ID Setting

1. Use PC software to change PTT-ID code.
2. Set the Menu 20 settings on the radio to select the PTTID signal mode (2Tone, 5Tone, or DTMF),

Press [F] Key + [2] Key + [0] Key + [F] Key + [UP] (DOWN) select signal+ [F] Key save the setting.
3. Set the Menu 22 settings to select when the PTTID is transmitted. Press [F] Key + [2] Key + [2] Key + [F] Key + [UP] (DOWN) select PTT-ID transmit time + [F] Key save setting.
4. Set the Menu 23 settings to program the PTTID transmit delay time. Press [F] Key + [2] Key + [3] Key + [F] Key + [UP] (DOWN) select delay time + [F] Key save setting.
5.When all the settings are set, when you transmit (Press the PTT) The radio will transmit the PTTID.

DTMF RX Settings

This radio has DTMF coding and decoding. Use the PC software to set the DTMF signal settings first. When you receive the DTMF tones required the, radio will show the code on your display and ring/page the radio (if you have Menu 27 set to ring the radio).

DTMF TX Settings

In two-way radio systems, DTMF is most commonly used for automation systems and remote control. A common example would be in amateur radio repeaters where some repeaters are activated by sending out a DTMF sequence (usually a simple single-digit sequence).

Table 7.1. DTMF frequencies and corresponding codes

	1209 Hz	1336 Hz	1477 Hz	1633 Hz
697 Hz	1	2	3	A - (MENU)
770 Hz	4	5	6	B - (▲)
852 Hz	7	8	9	C - (▼)
941 Hz	*	0	#	D - (EXIT)

The BTECH UV-2501+220 has a full implementation of DTMF, including the A, B, C and D codes. The numerical keys, as well as the (*) , and (#) , keys correspond to the matching DTMF codes as you would expect. The A, B, C and D codes are located in the (MENU), (▲), (▼) and (EXIT) keys respectively (†).

Manually TX DTMF Tones: To manually send DTMF codes, press the key(s) while holding down the PTT key.

Automatically TX DTMF Tones:

Save it to Memory and Transmit: You can also program a DTMF tone to the saved calling list (requires the PC software) to the one of the 15 Memory call banks in the radio. To transmit select the Pre-set DTMF saved setting on Menu 24 and then press the call key to send the saved DTMF TX tone.

Remote Stun

First set the DTMF Remote Stun Tone and Master Control ID in Software: When your radio receives the DTMF Remote Stun Tone Sequence (Set by software) (Requires Menu 20 and 21 to accept DTMF signaling) it will command the radio to disable transmitting abilities. The Master ID station must first identify and send the PTTID (set in software as "Master ID") – once the Master Station identifies itself, the radio is set to receive command tones, if the Monitor Remote Stun tone is received - the radio will no longer be able to transmit. *Both the master ID station and remote stun signal must be set up in software.*

Remote Kill

First set the DTMF Remote Kill Tone and Master Control ID in Software: When your radio receives the DTMF Remote Kill Tone Sequence (Set by software) (Requires Menu 20 and 21 to accept DTMF signaling) it will command the radio to disable transmitting and receiving. The Master ID station must first identify and send the PTTID (set in software as "Master ID") – once the Master Station identifies itself, the radio is set to receive command tones, if the Monitor Remote Kill tone is received - the radio will no longer be able to transmit or receive. *Both the master ID station and remote stun signal must be set up in software.*

Remote Revive

First set the DTMF Remote Revive Tone and Master Control ID in Software: When your radio receives the DTMF Remote Revive Tone Sequence (Set by software) (Requires Menu 20 and 21 to accept DTMF signaling) it will reactivate the radio after it has been remotely stunned or killed. The Master ID station must first identify and send the PTTID (set in software as "Master ID") – once the Master Station identifies itself, the radio is set to receive command tones, if the Monitor Remote Kill tone is received - the radio will revived from a stun/kill command. *Both the master ID station and remote stun signal must be set up in software.*

DTMF Receive Settings, Transmit Setting (Call Key)

1. Press [MENU] Key select 20 OPTSIG, press [F] Key select DTMF function.
2. Press [MENU] Key select 24 S-INFO, press [F] Key select pre-code signal group (1-16). (The DTMG Signal must be saved first in the PC software setting under DTMF.
3. If properly set up (on Menu 20 and 24), your radio will open the squelch when it receives the required DTMG signal.
4. Press [Call] Key to send the same DTMF you have selected in Menu 24.

2TONE Receive Settings, Transmit Setting (Call Key)

1. Press [MENU] Key select 20 OPTSIG, press [F] Key select 2TONE function.

2. Press [MENU] Key select 24 S-INFO, press [F] Key select pre-code signal group (1-16). (The 2Tone Signal must be saved first in the PC software setting under 2TONE.
3. If properly set up (on Menu 20 and 24), your radio will open the squelch when it receives the required 2TONE signal.
4. Press [Call] Key to send the same 2TONE you have selected in Menu 24.

5Tone Receive Settings, Transmit Setting (Call Key)

1. Press [MENU] Key select 20 OPTSIG, press [F] Key select 5TONE function.
2. Press [MENU] Key select 24 S-INFO, press [F] Key select pre-code signal group (1-16). (The 5Tone Signal must be saved first in the PC software setting under 2TONE.
3. If properly set up (on Menu 20 and 24), your radio will open the squelch when it receives the required 5TONE signal.
4. Press [Call] Key to send the same 5TONE you have selected in Menu 24.

Scanning modes

The scanner is configurable to one of three ways of operation: Time, carrier or search, each of which is explained in further details in their respective section below.

Procedure 5.1. Setting scanner mode

1. Press the [MENU] key to enter the menu.
2. Enter “19” on your numeric keypad to come to scanner mode.
3. Press the [MENU] key to select.
4. Use the [▲] and [▼] keys to select scanning mode.
5. Press the [MENU] key to confirm and save.
6. Press the [EXIT] key to exit the menu.

Time operation

In Time Operation (TO) mode, the scanner stops when it detects a signal, and after a factory pre-set time out, it resumes scanning.

Carrier operation

In Carrier Operation (CO) mode, the scanner stops when it detects a signal, and after a factory preset time with no signal it resumes scanning.

Search operation

In Search Operation (SE) mode, the scanner stops when it detects a signal.
To resume scanning you must press and hold the (*) key again.

Tone Scanning

Scanning for CTCSS and DCS Tones/Codes

Scanning for a CTCSS tone or DCS code can be done while Frequency Mode (VFO) or Channel Mode (MR) is selected. Only when VFO mode is selected, can the detected tone/code be saved to menu 11/10.

CTCSS tone and DCS code scanning mode can be accessed with or without a signal being present. The scanning process itself only occurs while a signal is being received.

Not all repeaters requiring a CTCSS tone or DCS code for access will transmit one back. In that case, the transmitter of a station that can access the repeater would need to be scanned. In other words: this would be done by listening to stations on the repeater's input frequency.

Scanning for CTCSS Tone

(ACTIVE SIGNAL REQUIRED)

1. Press the (MENU) key to enter the menu.
2. Enter (1STEP)(1STEP) on your numeric keypad to come to Menu 11: R-CTCS
3. Press the (MENU) key to select.
4. Press the (*SCAN) to begin CTCSS scanning

A flashing "CT" will be in the left status display to indicate the radio is in CTCSS scanning mode. In this mode, whenever the radio is receiving an RF signal on the selected MR channel or VFO frequency, the lower display will cycle through the CTCSS tones as they are being tested. Once the frequency of the received CTCSS tone is determined, the "CT" indicator will stop flashing.

Press the (MENU) key to save the scanned tone into memory (VFO Mode Only) then press the (EXIT) key to exit the menu.

Don't forget to set VFO menu 11 back to OFF when the CTCSS tone is no longer required.

Scanning for a DCS tone

(ACTIVE SIGNAL REQUIRED)

1. Press the (MENU) key to enter the menu.
2. Enter (1 STEP)(0 SQL) on your numeric keypad to come to Menu 10: R-DCS
3. Press the (MENU) key to select.
4. Press the (* SCAN) to begin DCS scanning

A flashing "DCS" will be in the left status display to indicate the radio is in DCS scanning mode. In this mode, whenever the radio is receiving an RF signal on the selected MR channel or VFO frequency, the lower display will cycle through the DCS codes as they are being tested. Once the bits of the received DCS code are determined, the "DCS" indicator will stop flashing.

Press the (MENU) key to save the scanned tone into memory (VFO Mode Only) then press the (EXIT) key to exit the menu.

Don't forget to set VFO menu 10 back to OFF when the DCS tone is no longer required.

Dual Watch (TDR)

In certain situations, the ability to monitor two channels at once can be a valuable asset. This can be achieved in one of two ways. You can either have one receiver in your radio and flip-flop between two frequencies at a fixed interval (known as Dual Watch), or you can equip a radio with two receivers (known as Dual Receive or Dual VFO.

The BTECH UV-2501+220 features Dual Watch functionality (single receiver) with the ability to lock the transmit frequency to one of the two channels it monitors.

1. Press the [MENU] key to enter the menu.
2. Enter "0" on the numeric keypad to get to Dual Watch (TDR).
3. Press [MENU] to select.
4. Use the [▲] and [▼] keys to enable or disable.
5. Press the [MENU] key to confirm.
6. Press the [EXIT] key to exit the menu.

Due to the way BTECH UV-2501+220 is constructed, whenever one of the A or B Frequencies (VFO/MR) goes active, it will default to transmit on that channel for the time you have selected on Menu 44.

Locking the Dual Watch transmit channel

1. Press the [MENU] key to enter the menu.
2. Enter 44 on the numeric keypad to get to TDR-AB.
3. Press [MENU] to select.
4. Use the [▲] and [▼] keys to select A (upper) or B (lower) display.
5. Select off, to turn off the TDR switching time.
6. Press the [MENU] key to confirm.
7. Press the [EXIT] key to exit the menu.

If you want to momentarily override the lock without having to setting the menu option to OFF, you can do so by pressing the [A/B] key an instant before pressing the PTT.

Dual Watch monitoring VHF/UHF and 220Mhz: The 220 MHz band antenna lowpass filter is switched with a relay and the 2 meter lowpass filter and 70 cm highpass filters are switched with PIN diodes - resulting in a audible relay switch noise when monitoring 220MHz with VHF/UHF simultaneously. A relay that completely isolated the 220 MHz RF filter won't impact the RF performance of the 2 meter/70 cm bands. If monitoring dual 220MHz or VHF/UHF simultaneously the relay is not heard or used.

Appendix A. - Menu definitions

0	TDR	Transmit Dual Receive	ON	Allows monitoring of 2 channels. Toggles between Freq A and B. If signal received, RX stays on Freq.
			OFF	Receives on selected channel
1	STEP	Frequency Step Size Setup	2.5 to 25. kHz	2.5, 5, 6.25, 10, 15, 25 kHz
2	SQL	Squelch Level	00 > 09	10 squelch levels 00 = minimum / normally open
3	TXP	Transmit Power	High	Full Power
			Low	Reduced Power
4	SCR	Voice Scrambler	ON	Activate Scrambler Function
			OFF	Deactivate Scrambler Function
5	TOT	Time Out Timer	15 > 600 secs	15 second steps
			OFF	Turn of Time out Timer
6	APO	Auto Power Off	30, 60 > 300 Minutes	Time set that radio will power off after the last signal has been received.
			OFF	Turn off APO
7	WN	Bandwidth	Wideband	25.0 kHz
			Narrowband	12.5 kHz
8	ABR	LCD Backlight Timer	1 > 50 secs	Backlight duration = 1 > 50
			OFF	Backlight remains ON.

9	BEEP	Keypad Voice Prompt	ON / OFF	Turn ON / OFF keypad voice prompt
10	R-DCS	Receive - Digital Coded Squelch	D023N > D754I	Squelch opens when proper DCS code is detected
			OFF	No DCS code required
11	R-CTCS	Receive - Analog Tone Squelch	67.0 > 254.1 Hz	Squelch opens when proper CTCSS tone detected
			OFF	No CTCSS tone required
12	T-DCS	Transmit - DCS Code	D023N > D754I	Transmits specified code
			OFF	No DCS code transmitted
13	T-CTCS	Transmit - CTCSS Code	67.0 > 254.1 Hz	Transmits specified tone
			OFF	No CTCSS tone transmitted
14	DTMFST	DTMF Side Tone	OFF	No tones are heard through the speaker when transmitted
			KEY	Only manually keyed DTMF codes are heard
			ANI	Only automatically keyed DTMF codes are heard
			BOTH	All DTMF codes are heard
15	BCL	Busy Channel Lockout	ON	Prevents transmit if active signal on the channel
			OFF	No lockout
16	SC-ADD	Add Scan Channel	ON	Add channel to scan list
			OFF	Remove channel from scan list
17	PRI-SC	Priority Scan	ON	Activate Priority Scan
			OFF	Deactivate Priority Scan
18	PRI-CH	Priority Channel	000 > 199	Channel selected for Priority Scan

19	SC-REV	Scan Resume Method	TO	(Time Operation) Scan stops when signal detected. Scan resumes after a predetermined time.
			CO	(Carrier Operation) Scan stops when signal detected. Scan resumes when signal disappears.
			SE	(Search Operation) Scan stops when signal detected. Scanning will not resume.
20	OPTSIG	Optional Signaling	OFF	No optional signaling
			DTMF	DTMF signaling selected
			2TONE	2TONE signaling selected
			5TONE	5TONE signaling selected
21	SPMUTE	Speaker Mute Settings	QT	Squelch opens for CTCSS/ DCS tones only.
			AND	Squelch opens when CTCSS/DCS tone is recognized along with the optional signaling.
			OR	Squelch opens when either the CTCSS/DCS tone OR the optional signaling is recognized.
22	PTT-ID	PTT ID - When to send	OFF	Do not send
			BOT	Send at Beginning of Transmission
			EOT	Send at the End of Transmission
			BOTH	Send at both Beginning and End
23	PTT-LT	PTT ID - Transmit Delay	0 > 30	Set Delay Time
24	S-INFO	Auto Group Dialing	Group Signal Code Memory	1 > 15 Can only be set with software

25	EMC-TP	Alarm Mode	ALARM	Turn on Alarm sound
			ANI	Send Alarm code and ID code
			BOTH	Both of the above
26	EMC-CH	Alarm Channel	000 > 199	Specified Alarm Channel
27	RING-T	Ring Time	OFF, 1 > 10	OFF - No Ring Time
				1 > 10 seconds ring time when signal code received
28	CHNAME	Channel Name	Channel Name Edit	In Channel Mode, edit the Current Name
29	CA-MDF	A Channel Display Mode	FREQ	In Channel Mode, display the selected format in display A
			CH	
			NAME	
30	CB-MDF	B Channel Display Mode	FREQ	In Channel Mode, display the selected format in display B
			CH	
			NAME	
31	SYNC	Sync Displays	OFF	Separate A/B channel display.
			ON	Display A and B are synced. This allows the upper display to show channel Name while the lower shows the Frequency.
32	PONMSG	Power On Message	FULL	Full Screen Display
			MSG	Show Power On Message
			BATT-V	Display Battery Voltage

33	WT-LED	Standby - Backlight Color Selection	OFF	Select desired color
			BLUE	
			ORANGE	
			PURPLE	
34	RX-LED	Receive - Backlight Color Selection	OFF	Select desired color
			BLUE	
			ORANGE	
			PURPLE	
35	TX-LED	Transmit - Backlight Color Selection	OFF	Select desired color
			Blue	
			ORANGE	
			PURPLE	
36	MEMCH	Memory Channel	000 > 199	Indicates channel number to be stored. "CH" will appear after channel is stored.
37	DELCH	Delete Channel	000 > 199	Indicates channel number to be deleted. "CH" will disappear after channel is deleted.
38	SFT-D	Frequency Shift Direction	OFF	No Offset (simplex)
			+	Plus frequency shift
			-	Minus frequency shift
39	OFFSET	Frequency Shift Offset Amount	00.00 > 69.99	Frequency shift in MHz
40	ANI		ANI ID Code	Can only be set with software

41	ANI-L	ANI Length	3, 4, 5	Length of ANI ID code
42	REP-S	Repeater Activation Tone	1000Hz 1450Hz 1750Hz 2100Hz	Audible tone for repeater activation
43	REP-M	Repeater Forwarding Mode (When using two units connected as a repeater, you can set the requirements to relay signals)	OFF	Function OFF
			CARRI	Forward after receiving Carrier
			CTDCS	Forward after receiving correct CTDCS
			TONE	Forward after receiving correct mono audio (Menu 42)
			DTMF	Forward after receiving assigned DTMF code. (ANI)
44	TDR-AB	TDR Return Time Delay	OFF	Function OFF
			1 > 50 seconds	This is the delay time before returning to the primary channel after secondary signal is clear.
45	STE	Squelch Tail Elimination Requires both radios have function ON.	OFF	Function OFF
			ON	Eliminates squelch tail at end of transmission.
46	RP-STE	Repeater Squelch Tail Elimination Requires a repeater using this function.	OFF	Function OFF
			1 > 10	Delay Time
47	RPT-DL	Repeater squelch tail delay.	OFF	Function OFF
			1 > 10	Delay Time

48	MIC-G	Microphone Audio Modulation Level	0 > 127	The Audio level of the transmitted microphone audio being sent over the air. 0 is the quietest level – while 127 is the loudest.
49	DTMF-G	DTMF Audio Modulation Level	0 > 60	The Audio level of the DTMF tones being sent over the air. 0 is the quietest level – while 60 is the loudest.
50	RESET	Initialize to Factory Defaults	VFO	Menu Initialization
			ALL	Menu and Channel Initialization

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Appendix B. - Technical specifications

General

General specifications

Specification	Value
Frequency Range (MHz)	65-108 (Rx only) 136-174 (Rx/Tx) 210-230 (Rx/Tx) 400-520 (Rx/Tx)
Memory channels	200
Frequency stability	2.5ppm
Frequency step (kHz)	2.5K/5.0K/6.25K/10.0K/12.5K/25.0K
Squelch Setup	CARRIER / CTCSS / DCS / 5Tone / 2TONE / DTMF
Antenna impedance	50 Ohm
Operating temperature	-20°C to +60°C
Supply voltage	13.8V DC±15%
Dimension	UV-2501+220: 98(w) x 35 (H) x 118 (D) mm; 408g
Operating Temperature	-5°F - +140°F

Receiver

Receiver specifications

	Broadband	Narrow band
Sensitivity	≤0.25μV	≤0.35μV
Channel choice	≥70dB	≥60dB
Intermodulation	≥:65dB	≥60dB
Spurious Rejection	≥70dB	≥70dB
Audio response	+1~-3dB (0.3-3KHz)	+1~-3dB (0.3~2.55KHz)
Signal to noise ratio	≥45dB	≥40dB
Audio Distortion	≤ 5%	
Audio output power	≥2W@10%	

Transmit

	Broadband	Narrow band
Output power	25W / 10W (VHF/220/UHF} UV-2501+220	
Modulation Mode	16K0F3E	11K0F3E
Channel Power	≥70dB	≥60B
Signal to noise ratio	≥40dB	≥36dB
Parasitic harmonic	≥60dB	≥60dB
Audio response	+1--3dB (0.3-3KHz)	+1--3dB (0.3-2.55KHz)
Audio distortion	≤ 5%	