



Go Beyond Normal Limits...SM



7 SERIES

BASE RADIO

OWNER'S MANUAL

- Models for licensed VHF and UHF Part 90 operation
-  License-free VHF Part 95 MURS models for USA
-  License-free UHF GMRS models for Canada
- Expanded Field Programming capability
- DTMF encode and decode capability
- NOAA Weather Radio feature built-in to all VHF models



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THANK YOU FOR CHOOSING RITRON

Congratulations on your purchase of the RQX Base Radio. Your new radio is the culmination of RITRON's 40 years of designing, manufacturing, and supplying reliable, professional wireless communication products. Ritron wireless products will improve the operation, safety, and profitability of any organization by providing instant voice communications between employees throughout the workplace.

BASE RADIO MODEL NUMBERS

Due to FCC Rules please be advised that the new VHF 7-Series Base Station Radio is offered in 2 models, license-free MURS Part 95 frequency models and the licensed Part 90 VHF frequency models. Please verify the frequencies you need and order the appropriate model.

MURS Part 95 license-free models can only operate on the following MURS frequencies, whereas licensed Part 90 VHF radios cannot operate on the MURS frequencies.

Ritron Code	MURS Frequency	Color Dot	BW
01	154.600 MHz	Green Dot	25.0
02	154.570 MHz	Blue Dot	25.0
19	151.820 MHz	MURS	12.5
20	151.880 MHz	MURS	12.5
21	151.940 MHz	MURS	12.5
22	154.600 MHz	MURS	12.5
23	154.570 MHz	MURS	12.5

License-Free VHF MURS MODELS FOR USA:



JBS-147M (Jobcom)	(2.0W, 7 Ch)
PBS-147M (Ritron)	(2.0W, 7 Ch)

Licensed VHF MODELS FOR USA:



JBS-147D (Jobcom)	(2.5W, 10 Ch)
PBS-147D (Ritron)	(2.5W, 10 Ch)

Licensed UHF MODELS FOR USA:



JBS-447D (Jobcom)	(2.0W, 10 Ch)
PBS-447D (Ritron)	(2.0W, 10 Ch)

Licensed VHF MODELS FOR CANADA:



JBS-147D-CANADA (Jobcom)	(2.5W, 10 Ch)
PBS-147D-CANADA (Ritron)	(2.5W, 10 Ch)

Licensed UHF MODELS FOR CANADA:



JBS-447D-CANADA (Jobcom)	(2.0W, 10 Ch)
PBS-447D-CANADA (Ritron)	(2.0W, 10 Ch)

License-Free UHF MODELS FOR CANADA:



JBS-447D-CANADA-GMRS (Jobcom)	(2.0W, 10 Ch)
PBS-447D-CANADA-GMRS (Ritron)	(2.0W, 10 Ch)

The model number located on the back of the radio case indicates its operating band.

VHF radios are designed to operate on up to ten channels within the 24 MHz band between factory standard 150 and 174 MHz.

UHF radios are designed to operate on up to ten channels within the 20 MHz band between factory standard 450 and 470 MHz.

BASIC FEATURES

This manual covers Ritron JBS/PBS base radios. A rugged, programmable two-way desktop base radio designed to operate in a professional FM communications band (VHF or UHF business available). Each radio is equipped with these features:

- **Push-button Operating Controls.** The Push-To-Talk (PTT), Channel, On / Volume Up, Volume Down / Off and the special feature "Z" button controls are conveniently located on the face of the radio.
 - **10-channel Capability.** Up to 10 channels can be programmed to contain a unique set of operating frequencies and options.
 - **Channel Display.** The LED display will show the current operating channel, and contains a transmit / busy lamp. The display is also used to indicate volume level and paging decode status on radios programmed for DTMF, Selcall or 2-Tone paging operation.
 - **QC (Quiet Call) and DQC (Digital Quiet Call) Interference Eliminator Codes.** Each channel can be programmed from a list of 50 QC sub-audible or 104 DQC digital privacy codes.
 - **Field programming.** The JBS/PBS base radio allows you to quickly select and program each channel individually while in the field without the need for a PC programmer. Each channel can be programmed to one of 27 VHF or 114 UHF channel table frequencies and one of 50 QC or 104 DQC interference eliminator codes, or you can delete a channel altogether.
- NOTE:** JBS-147M and PBS-147D MURS radios are limited to the 7 VHF MURS frequencies. JBS-447D-CANADA-GMRS is limited to the 15 GMRS frequencies.
- **Channel Scanning.** Channel Scan allows scanning of all channels programmed into the radio, and can be turned On and Off through Field programming. The scan channel has many features, including Priority Scanning and Busy Channel Blocking.
 - **Special Feature "Z" button.** The "Z" button is capable of performing one of a variety of functions. These functions can be PC programmed by your dealer OR assigned to the "Z" button by the end user.
 - "Z" button functions: Channel Scan, Weather Channel, Monitor, Send 2-Tone Code, Send Call Tone, Send DTMF or Selcall ANI.
 - **2-Tone Decode.** Each channel can be programmed for 2-Tone paging decode within a frequency range of 300-1500 Hz. Additional 2-tone paging features include Group Call, All Call, automatic reset, and transpond alert.
 - **2-Tone Encode.** Each channel can be programmed for 2-Tone paging encode within a frequency range of 300-1500 Hz.
 - **DTMF or Selcall ANI.** Each channel can be programmed to transmit a unique DTMF or Selcall ANI string with the "Z" button programmed for DTMF or Selcall ANI.
 - **Alert Tones.** Each channel is programmable for a variety of alert tones that include RX courtesy beep, TX clear to talk beep, busy channel lockout alert, last active channel marker, and channel scanning indicator.

Additional features require special PC programming:

See your Ritron dealer or contact Ritron directly for PC programming of these optional features.

- **Squelch Adjustment.** Squelch sensitivity can be programmed on a per channel basis to meet your specific needs.

- **Weather Channel.** VHF models can be programmed to receive your local NOAA weather radio broadcast. The Weather channel can be turned On and Off through Field Programming.
- **Weather Alert.** VHF models can be programmed to alert you when the National Weather Service detects threatening weather conditions. The Weather Alert feature can be turned On and Off through Field Programming.



JBS-147M AND PBS-147M

Ritron models JBS-147M AND PBS-147M are license-free radios sold only in the USA. These models can only operate on the 5 MURS frequencies available through Field or PC programming.

JBS-447D-CANADA-GMRS AND PBS-447D-CANADA-GMRS

Ritron models JBS-447D-CANADA-GMRS and PBS-447D-CANADA-GMRS are license-free radios sold only in Canada. These models can only operate on the 15 GMRS frequencies available through Field or PC programming.

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:

- (1) *This device may not cause interference; and*
- (2) *This device must accept any interference, including interference that may cause undesired operation of the device.*

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) *L'appareil ne doit pas produire de brouillage;*
- (2) *L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

This radio transmitter (1084A-RIT37447G) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (1084A-RIT37447G) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

AFB-1545 (included with radio)

-2 dBi gain max

RAM-1545 (optional magnet-mount antenna)

2 dBi gain max

OPTIONAL REPLACEMENT ACCESSORIES**TO ORDER CALL 800-USA-1-USA**

AFB-1545 Molded Flex, Dual-band Replacement Antenna

RAM-1545 Magnet-mounted, Dual-band Antenna w / BNC

RPS-1B Replacement 110 VAC Power Supply

CCL-M 12 VDC, Cigarette Lighter Adaptor

JBSK-12 12 VDC, Adaptor Kit

REP-2 Low Profile Earphone

RHD-IX Single Ear Headset

RHD-4X Dual Ear Headset

RHD-6X Lightweight Behind-the-head Earset w / In-line PTT

RHD-8X Lightweight Earbud w / mic and In-line PTT

RSM-3XA Remote Speaker Microphone

RM-7 Hand Microphone & Hang-up Bracket

RSP-5 External Speaker w / 5 Watt Audio Capability

JBS-MMK Mobile Mounting Kit

(Does not include screws to mount bracket to wall or vehicle)

Call RITRON for a complete listing.



JBSK-12
12-Volt Adapter Kit



RHD-6X
Behind the Ear Headset



RHD-8X
Single Earbud



Ram-1545
Magnet-mounted Dual-band Antenna



RSP-5
5-Watt External Speaker



RM-7
Hand Microphone

EXPOSURE TO RADIO FREQUENCY ENERGY

These products generate radio frequency (RF) energy when the PTT button on the front of the unit is depressed. The product has been evaluated for compliance with the maximum permissible exposure limits for RF energy at the maximum power rating of the unit when using antennas available from RITRON. Antennas other than those mentioned below have not been tested for compliance and may or may not meet the exposure limits at the distances given. Higher gain antennas are capable of generating higher fields in the strongest part of their field and would, therefore, require a greater separation from the antenna.

JBS-147D, JBS-147D-CANADA, PBS-147D, PBS-147D-CANADA: Using the AFB-1545 antenna (included with the product) in a vertical orientation at the 20 cm (7.9 inches) minimum expected separation distance and greater, the maximum RF exposure is well below the General Population/Uncontrolled limits. Antennas other than those available from RITRON have not been tested for compliance and may or may not meet the exposure limits at the distances given. Higher gain antennas are capable of generating higher fields in the strongest part of their field and would, therefore, require a greater separation from the antenna. This product is not to be used by the general public in an uncontrolled environment unless compliance with the Uncontrolled/General Population limits for RF exposure can be assured.

JBS-447D, JBS-447D-CANADA, PBS-447D, PBS-447D-CANADA: Using the AFB-1545 (included with the product) antenna in a vertical orientation at the 20 cm (7.9 inches) minimum expected separation distance and greater, the maximum RF exposure is well below the General Population/Uncontrolled limits. Antennas other than those available from RITRON have not been tested for compliance and may or may not meet the exposure limits at the distances given. Higher gain antennas are capable of generating higher fields in the strongest part of their field and would, therefore, require a greater separation from the antenna. This product is not to be used by the general public in an uncontrolled environment unless compliance with the Uncontrolled/General Population limits for RF exposure can be assured.

JBS-447D-CANADA-GMRS, PBS-447D-CANADA-GMRS

Using the AFB-1545 antenna (included with the product) in a vertical orientation at the 20 cm (7.9 inches) minimum expected separation distance and greater, the maximum RF exposure is well below the General Population/Uncontrolled limits. When using the RAM-1545 (optional magnet-mount antenna with 25' cable) in a vertical orientation a 27.24 cm separation distance is required. Antennas other than those available from RITRON have not been tested for compliance and may or may not meet the exposure limits at the distances given. Higher gain antennas are capable of generating higher fields in the strongest part of their field and would, therefore, require a greater separation from the antenna. This product is not to be used by the general public in an uncontrolled environment unless compliance with the Uncontrolled/General Population limits for RF exposure can be assured.

To limit exposure to RF energy to levels below the limit, please observe the following:

- Use only the antenna(s) available from RITRON for these models. DO NOT operate the radio without an antenna.
- DO NOT transmit more than 50% of the time.
- When transmitting, make certain that the distance limits for the particular model in use are observed.
- DO NOT allow children to operate the radio.

When used as directed, this series of radios is designed to comply with the IC's RF exposure limits for "Uncontrolled/General Population". In addition, they are designed to comply with the following Standards and Guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR §§ 2 sub-part J.
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992.
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition. Copyright Telecommunications Industry Association

2013 FCC NARROWBAND MANDATE

On January 1, 2013, pursuant to the FCC Narrowband mandate, Ritron will no longer be allowed to manufacture wide band (25 kHz) capable radio equipment that operates in the frequency bands from 150 MHz to 512 MHz. All Ritron Base Radios are FCC certified for narrowband operation, so the only change required is the elimination of wideband operation.

To meet the FCC narrowband mandate by Jan 1, 2013, Ritron will initiate the transition process of manufacturing narrowband only compliant radio equipment beginning July 1, 2012. After that date, customer orders will begin to be filled with radios manufactured for FCC narrowband compliance, with no provisions for wideband operation except where allowed by FCC rule. These radios will be clearly marked as "FCC Narrowband Compliant". The narrowband manufacturing process will proceed gradually on a model by model basis, with all models narrowband compliant by the January 1, 2013 deadline.

For a complete list of Ritron radios capable of narrowband operation; a Ritron FAQ on the subject, and various links on the FCC website dealing with Narrowbanding go to:

www.ritron.com/narrowband

If you have any questions contact us at 1-800-872-1872

OBSERVE CAUTION IN THE FOLLOWING ENVIRONMENTS TO MAXIMIZE THE LIFE OF YOUR RADIO EQUIPMENT

LOCATION: Be aware that this radio and / or antenna may create interference with, or be interfered with, by nearby electronic equipment such as computers, monitors, keyboards, electronic telephones and other sensitive devices. Either move the equipment or use a remote antenna to separate components sufficiently to stop or reduce interference.

MOISTURE: Ritron base radios are not waterproof. DO NOT directly expose them to rain or excessive moisture.

CHEMICALS: Detergents, alcohol, aerosol sprays or petroleum products can damage the radio case. DO NOT use petroleum solvents of any kind; use a soft cloth moistened with water to clean the case.

EXTREME HEAT: High temperatures can damage the radio and its components. DO NOT expose the units to extreme heat or leave them in direct sunlight.

EXCESSIVE TRANSMISSIONS: DO NOT hold the Push-To-Talk switch down longer than necessary during transmission intervals.

VIBRATION / SHOCK: Although your Ritron base radio is designed to be rugged, it will not survive excessive abuse. Avoid dropping the radio.

RADIO CONTROLS

1 CHANNEL DISPLAY

The channel display will indicate the current operating channel. When the Scan Channel is selected the display will rapidly flash the channels being scanned, and will stop when a channel is received. The channel display also indicates the volume level between 0-9 whenever a volume control is pressed.

2 CHANNEL SELECTOR

Press the Channel Selector button and the radio will advance the channel. The Channel Beep will be heard any time Channel 1 is selected. When the Scan Channel is selected the radio will sound the Scan Beep and begin scanning.

3 AUDIO ACCESSORY JACK

The audio accessory jack is used to plug in earphone options and, in conjunction with the microphone jack, to connect an optional remote speaker / microphone or a single-ear or dual-ear headset. This jack is also used for PC programming.

4 MICROPHONE JACK

The microphone jack is used to connect optional external microphones and, in conjunction with the audio accessory jack, to connect an optional remote speaker / microphone, or a single-ear or dual-ear headset.

5 SPEAKER

The speaker allows you to hear calls on your channel.

6 POWER CONNECTOR (TOP END OF CASE)

The power connector on the top end of the radio is used to connect power to the unit, either an external 12 VDC supply or the RPS-1B cube power supply included with the radio.

7 ANTENNA

The flexible antenna radiates and receives radio signals. The antenna connects to a BNC type connector located on the top end of the radio.

NOTE: The AFB-1545 antenna included with the radio will work with VHF and UHF radios.

8 PUSH-TO-TALK SWITCH (PTT)

Press and hold the PTT when transmitting; release it to receive.

9 "Z" BUTTON - PROGRAMMABLE SOFT KEY

The "Z" button is capable of performing one of a variety of functions. These functions can be PC programmed OR can be assigned to the "Z" button by the end user. Function options: Channel Scan, Weather Channel, Monitor, Send 2-Tone Code, Send Call Tone, Send DTMF or Selcall ANI.

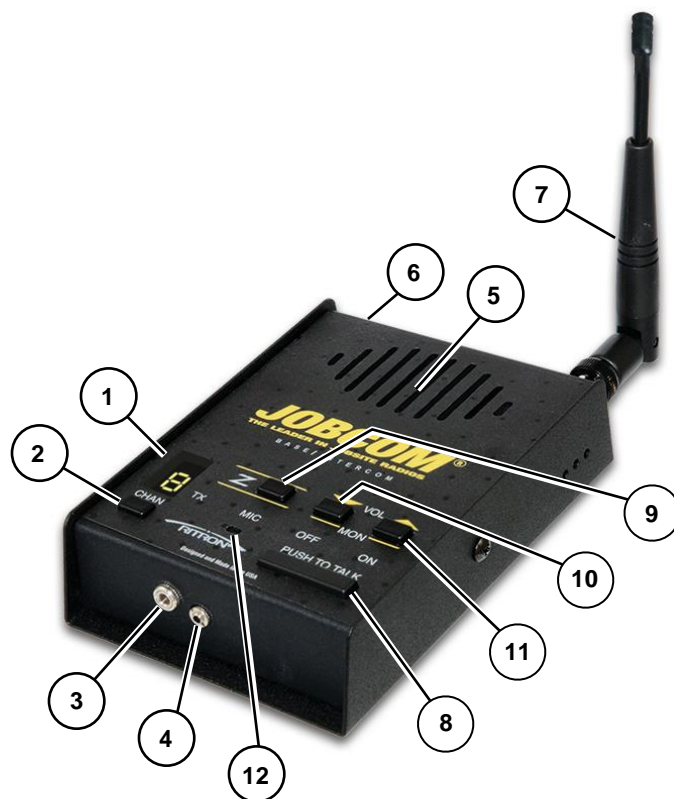


FIG-1: RADIO CONTROLS & CONNECTORS

10 VOLUME DOWN / OFF

Press the Volume Down / Off button to decrease volume. The channel display will indicate the volume level as long as the Volume Down / Off button is pressed. To turn Off the unit, press and hold this button until the speaker sounds a double beep.

11 ON / VOLUME UP

To turn the unit On, press the On / Volume Up button; the speaker will sound the Channel Beep. If the radio turns on to the Scan Channel it will sound the Scan Beep. Once the radio is On, press this button to increase volume. The channel display will indicate the volume level as long as the On / Volume Up button is pressed.

12 MICROPHONE

The microphone allows your voice to be heard in transmissions to other radios. Speak in a normal tone; shouting does not improve your listeners' reception.

ON-OFF VOLUME ADJUST

To turn on the radio - press the On / Volume Up button. The radio will sound the Channel Beep. If the radio turns on to the Scan Channel it will emit the Scan Beep. The radio will turn on to the channel that was selected when it was last turned off, or can be programmed to turn on to Channel 1.

NOTE: JBS-147D-A and JBS-447D-A turn on automatically any time power is applied to the radio.

To adjust the volume - press the volume up or the volume down button until you reach the desired level. The display will show the volume level on a 0-9 scale as long as the volume button is pressed, and you will hear any received broadcasts on the channel.

To turn off the radio - press and hold the Off / Volume Down button until a two tone "turn-off" beep is heard. For instant turn-off, press the PTT button while holding the Off / Volume Down button.



As long as the Volume Up button is held down the volume will increase and the display will indicate the volume level as number between 0 and 9. When the Volume Down button is held down the volume will decrease and the display will indicate the volume level as a number between 9 and 0.

FIG-2: VOLUME LEVEL INDICATOR

CHANNEL SELECTION

To change channels - press and release the Channel Selector button. The radio will increment the channel, and the Channel Display will show the new operating channel. If the highest channel number is selected and you press the Channel Selector button, the radio resets to channel 1 and the Channel Beep is heard on the speaker.

To access the Scan Channel - Press the "Z" Button if it has been programmed for SCAN, otherwise use the Channel Selector button where the Scan Channel will appear after the last programmed channel. When the Scan Channel is selected the radio will sound the Scan Beep and the Channel Display will rapidly flash the channel numbers as they are scanned. If a signal is received the channel display will indicate the channel number, and when the received signal is removed the radio will wait briefly, sound the Scan Beep, then scanning will resume as normal.

To access the Weather Channel - Press and release the "Z" button if it has been programmed for WEATHER, otherwise use the Channel Selector button where the Weather Channel will appear after the last programmed channel and after the Scan channel. When the Weather Channel is selected on a VHF radio the display will light a single segment of the display that indicates which of the seven NOAA frequencies is monitored. See the "NOAA Weather Radio Feature" section for details.

RECEIVE

To hear calls from other users - adjust the volume as desired. The radio can only receive broadcasts while the Push-To-Talk

button is not being pressed. Whether or not you hear these broadcasts depends upon the squelch settings.

There are three standard squelch modes that can be used in the JBS / PBS base radio.

- Carrier Squelch lets you hear all broadcasts on your channel strong enough for the radio to detect, and silences noise.
- Tone Squelch uses the QC or DQC "tone squelch" format available on the JBS / PBS. This allows you to screen out "on-channel" broadcasts that do not carry the correct code programmed for the radio.
- 2-Tone, DTMF or Selcall Paging Decode can be used in conjunction with either carrier or tone squelch to block out all calls except those sent specifically to your radio. When the unique paging decode sequence programmed into the radio is decoded, the radio will emit a series of ring tones similar to a telephone.

When Carrier or Tone Squelch is selected by the user, all channels will operate in that mode. The JBS / PBS base radio will operate in tone squelch mode when it is first turned on.

QC AND DQC TONE CODES

Tone codes filter out static, noise and reduce unwanted "chatter" on radio channels. When you operate on a frequency with a tone code, you screen out most interference. This allows you to communicate with less interference and to hear only those users in your radio group.

IMPORTANT! All radios in the talk group must operate on the same frequency and tone code.

SQUELCH MODES

To activate Tone Squelch or Carrier Squelch and to Monitor the channel - you may either simultaneously press both the On / Volume Up and Volume Down / Off volume buttons and hold briefly before releasing, or if the "Z" button is set for the monitor function, then press the "Z" button and release. To advance to the next squelch mode simultaneously press both volume buttons, or press the "Z" button.

1. If the base radio emits a SINGLE beep, then Tone Squelch is turned ON and you will only hear radio transmissions on that channel with the same QC or DQC tone codes as your base radio.
2. If the base radio emits a DOUBLE beep, then you are in Carrier Squelch and you can Monitor all broadcasts on the channel. To exit Carrier Squelch press and hold both volume buttons until you hear the SINGLE beep.
3. If the base radio emits a TRIPLE beep, then you are in Paging Decode. You will only hear broadcasts that first send your unique paging tones. If you are unable to set the base radio, you have selected a channel that is not programmed for Paging Decode.

If you are unable to activate Carrier Squelch - the channel has been programmed for Monitor Lockout.

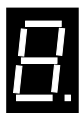
Using the "Z" button for Monitor - the JBS / PBS base radio "Z" button can be programmed for Monitor mode.

TRANSMIT

Normally, you should monitor the channel before transmitting and talk only when the channel is clear.

To transmit - hold down the Push-To-Talk button and, with the radio at least 6 inches away, talk into the microphone. Speak in a normal tone, since talking louder will not improve the listener's reception.

Keep talk times as short and infrequent as possible to allow others to use the channel.



A Transmit / Busy Lamp in the lower right corner of the Channel Display lights whenever the transmitter is activated and blinks when the channel is busy.

FIG-3: TRANSMIT / BUSY LAMP

RADIO ALERT TONES

The base radio responds to certain instructions by sounding a beep or series of tones. These tones can tell you that the radio is working as you expect.

Power On / Self Check "OK"

When it is first turned on, the base radio runs a quick "self test" to confirm basic functions. When complete the base radio will emit the Channel Beep and the Channel Display will show the operating channel. The base radio is then ready to use.

Error Tones

However, if the "self test" detects a diagnostic error, an error tone sounds. Turn off the radio and try again. The error tone will also sound if a channel has been programmed for an invalid frequency.

A long, low-pitched tone means the supply voltage is too low to operate the base radio. If you cannot correct the problem, consult an authorized Ritron service center or Ritron directly.

Squelch Mode

When you press and hold both Volume buttons at the same time, a SINGLE beep will sound to indicate that tone squelch is on. A DOUBLE beep means that carrier squelch is on. If the channel is programmed for Paging Decode, a TRIPLE beep indicates that the base radio is in Paging Decode mode.

Transmitter Time Out

A low tone followed by a higher-pitched tone sounds and the transmitter automatically shuts off if you hold down the PTT button longer than 60 seconds.

Battery Alert Tone

In battery powered installations: Once the battery voltage drops below the required "operating voltage" the radio emits a long, low tone and turns itself off.

Courtesy Beep

A short tone sounds at the end of each received transmission to indicate that the channel is clear and you may transmit.

Busy Channel TX Inhibit

If a user is transmitting on your radio frequency without your tone, you will not be allowed to transmit. The base radio will beep a series of long, low tones while the PTT is held down (like a busy signal).

Transmit Clear to Talk Beep

A short tone sounds after the PTT has been pressed to indicate that the base radio is ready for you to begin talking.

CHANNEL SCAN OPERATION

Channel scanning allows you to listen to broadcasts on your radio channels. The JBS / PBS base radio will scan all channels programmed into the radio except the NOAA Weather Channel.

How Scanning Works

Using the Channel Selector button, select the Scan channel. The base radio sounds the Scan Beep, and then repeatedly checks each channel in the scan list. The channel display will show the channel numbers as they are scanned.

When receiving a call on a channel being scanned, the base radio will stop scanning to let you hear communications on that channel. After the transmission has ended the base radio will pause before it resumes scanning to allow you time to respond.

When transmitting from the Scan channel, the base radio will go to the last channel on which a signal was received, then transmit. After you release the PTT the base radio will pause to allow time for a response, and then resume scanning.

Temporary Busy Channel Blocking

If one of the channels in the scan list is so busy that you want to temporarily block it out, press the Channel Selector button while the base radio is stopped on the channel to be blocked and hold it until scanning resumes. The blocked channel will now be skipped in the scan list.

The blocked channel will be returned to the scan list if the base radio is turned off and then back on again, or when the radio channel is changed using the Channel Selector button. The first channel in the scan list cannot be blocked.

To turn Channel Scan On / Off see "How to Field Program Advanced Feature Codes" on page 19.

Last Channel Scanned Alert Tone

When changing channels with the Channel Selector button, an alert tone will sound to indicate the last channel that received a message when the radio was scanning. This will identify the channel on which the last message was received, and allow uninterrupted transmission on that channel without the constraints of scanning. You can then press the Channel Selector button to return to the scan channel.

Using the "Z" Button for Scan

The special feature "Z" button can be programmed to initiate scanning. The UHF JBS-447D and PBS-447D base radios are programmed for "Z" button Scan channel operation from the factory.

To select the Scan Channel, press the "Z" button. The radio sounds the Scan Beep, and scanning operation is initiated. The Scan channel will not be accessible with the Channel Selector

button when the base radio is programmed for 'Z' button Scan channel operation.

To return to normal channel operation, press the Channel Selector button and the base radio will return to channel 1.

To temporarily block a busy channel while scanning, press the "Z" button while the base radio is stopped on the channel to be blocked and hold it until scanning resumes. The blocked channel will now be skipped in the scan list.

Priority Scanning (Optional)

The base radio can be optionally programmed for priority scanning. Priority Scan allows you to periodically monitor a Priority Channel, even if the base radio has stopped on another channel. This will prevent missed calls on the primary operating channel when in scan mode.

With Priority Scan enabled:

- The first channel in the scan list is the Priority Channel.
- The radio checks the Priority Channel every two seconds to check for activity. This time is programmable and can be set for 1 - 8 seconds.
- The base radio can be programmed to transmit only on the Priority Channel when scanning.
- The base radio can be programmed to sound a Priority Channel Beep whenever the base radio receives on the Priority Channel when scanning.

See your Ritron dealer or contact Ritron directly for PC programming of this option.

PAGING DECODE OPERATION

To use Paging Decode a base radio channel must be programmed for 2-Tone, DTMF or Selcall Paging Decode. The radio does not operate with Paging Decode as it is received from the factory.

To activate Paging Decode you must first select a radio channel that has been programmed for Paging Decode. The factory default setting will automatically activate Paging Decode any time the Paging Decode channel is selected. If not, simultaneously press both of the volume buttons and hold briefly before releasing. The radio sounds three beeps when Paging Decode is turned on.

If you are unable to set the base radio, you have selected a channel that is not programmed for Paging Decode.

When the base radio decodes an incoming Paging signal it will emit a "ring" tone similar to a telephone and the display will show a "C" to indicate that a call has been received. You can now proceed with normal two-way communication until the Paging Decode feature has been reset. The "ring" tone will sound every time a Paging signal is decoded.



The display will show a "C" to indicate that a Paging call has been received.

FIG-4: PAGING ALERT CALL

To reset Paging Decode after receiving a call: Simultaneously press both of the volume buttons and hold briefly before releasing. The base radio sounds three beeps when Paging Decode is reset and the display will show the channel number. The base radio can be optionally programmed to automatically reset if a call is not answered within 15 seconds.

Paging Decode channels can be programmed to:

- Automatically set the base radio for Paging Decode mode whenever the channel is selected.
- Automatically reset if a Paging Decode is not answered within 15 seconds.
- Automatically place the receiver into carrier squelch "monitor" mode whenever a Paging Decode has been decoded.
- Send a transpond tone back to the transmitting station to confirm that the Paging signal has been received.
- Decode an All Call page.
- Decode a Group Call page (If set for 2-Tone paging, Group Call is when the first tone is sent for an extended period of time).

"Z" BUTTON - PROGRAMMABLE SOFT KEY

The "Z" button is capable performing one of a variety of functions. These functions can be PC programmed by your dealer OR can also be assigned to the "Z" button by the end user. Function options: Channel Scan, Weather Channel, Monitor, Send 2-Tone Code, Send Call Tone, Send DTMF ANI, Send Selcall ANI. Refer to the Dealer PC programmer HELP file for specific "Z" button programming instructions.

To assign the "Z" Button for one of these features:

- Scan
- Weather
- Monitor
- Call Tone
- DTMF ANI
- Selcall ANI
- 2-Tone Encode

See "How to Field Program Advanced Feature Codes" on page 19.

Scan

The UHF PBS-447D and JBS-447D base radios are programmed for "Z" button Channel Scan operation from the factory.

See "Using the "Z" Button for Scan" on page 6.

Weather

The "Z" button on the VHF JBS-147D base radios are programmed for Weather Channel operation from the factory. This option is only available on VHF band radios.

See "Using the "Z" Button to Access NOAA Weather" on page 9.

Monitor

The "Z" button can be programmed to function as a MONITOR button. See page 19 to select this option.

See "Squelch Modes" on page 5 to Set Carrier, Tone, or 2-Tone Paging Functions.

Call Tone

When the “Z” button is pressed the radio transmits a Call Tone on the channel currently selected. If you continue to hold the “Z” button down, the transmitter will remain active and voice communications can be made after the Call Tone has been sent.

This feature is helpful when the receiving base radio is in a high noise environment and may not hear a voice transmission.

2-Tone Encode Operation

Pressing the “Z” button causes the base radio to transmit a unique 2-Tone Code that can be programmed separately for each channel. The 2-Tone Code will be heard on the speaker, and if you continue to hold the “Z” button down, the transmitter will remain active and voice communications will be possible after the 2-Tone Code has been sent.

- Use the PTT button to transmit messages without the 2-Tone Code.
- If a channel is not programmed to encode a 2-Tone signal the “Z” button will function as a PTT button.

See “How to Field Program 2-Tone, DTMF or Selcall Encode (Transmit) Operation” on page 15.

DTMF or Selcall ANI

Pressing the “Z” button causes the radio to transmit a unique DTMF ANI string that can be programmed separately for each channel. The DTMF string will be heard on the speaker, and if you continue to hold the “Z” button down, the transmitter will remain active and voice communications will be possible after the DTMF ANI string has been sent.

- Use the PTT button to transmit messages without DTMF or Selcall ANI.
- If a channel is not programmed to send DTMF or Selcall ANI the “Z” button will function as a PTT button.

HOW TO SELECT YOUR LOCAL NOAA WEATHER FREQUENCY (VHF MODELS ONLY)

The VHF base radio is shipped from the factory without a NOAA frequency selected. You must first select your local NOAA frequency to activate NOAA weather features. Follow steps 1-7 below.

All VHF models of the JBS / PBS base radio can hear weather forecasts from the National Weather Service which are broadcast on one of the seven NOAA weather frequencies. In some areas you may be able to receive more than one broadcast.

1. Follow the steps in FIG-5 below to place the radio into the Weather Frequency Select mode.
2. The base radio will scan to the first NOAA frequency where a broadcast is present. The display will light a single segment to indicate the NOAA frequency per FIG-6 below.
3. Monitor the channel for a few minutes to be sure it is the broadcast for your local area.
4. Press the "Z" button to scan for the presence of any other NOAA broadcasts, monitoring each broadcast and noting the frequency as indicated by the display.
5. Using the "Z" button, select the local NOAA frequency you would like your radio to operate on.
6. Turn the base radio off by pressing the Volume Down / Off button.
7. When the base radio is turned back on all weather features will operate on the selected NOAA frequency.

NOTE: If the base radio is moved, for example, to another state you must re-train your base radio with a new local NOAA frequency.

NOAA WEATHER FEATURE

After you have selected a NOAA weather frequency on your VHF model base radio, an extra channel is automatically created exclusively for listening to National Weather Service broadcasts.

Repeatedly pressing the Channel button will advance through your base radio talk channels. NOAA Weather will be your last channel, and the display will light the segment representing the selected NOAA frequency.

If you do not want the NOAA Weather feature, it can be turned off through Field Programming.

To turn NOAA Weather Feature On / Off see "How to Field Program Advanced Feature Codes" on page 19.

NOAA WEATHER ALERT FEATURE

Once a NOAA weather frequency has been selected on your VHF model base radio it will listen for emergency broadcasts from the National Weather Service, regardless of which channel you are on.

An alert tone will sound in the speaker, the display will show an "A" (as shown), and the National Weather Service emergency broadcast will be heard - advising you of threatening weather conditions.

NOTE: NOAA sends a test alert tone once each week. Your base radio will respond to this alert.

To turn Weather NOAA Alert On / Off see "How to Field Program Advanced Feature Codes" on page 19.

- Pressing the Channel button will return you to your normal talk channel.
- If you do not want the NOAA Weather Alert feature, it can be turned off through Field Programming, refer to page 19.

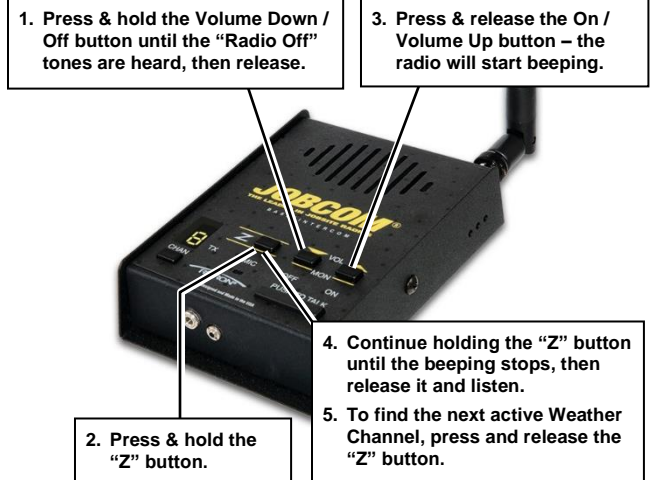
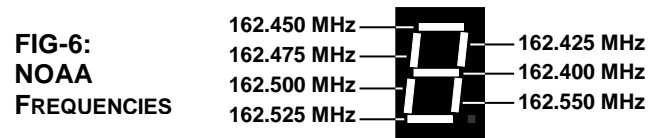


FIG-5: SELECTING YOUR LOCAL NOAA WEATHER FREQUENCY



USING THE "Z" BUTTON TO ACCESS NOAA WEATHER

The VHF JBS-147D base radios are programmed for "Z" button NOAA Weather operation from the factory. This option is only available on VHF band base radios.

- To select NOAA Weather, press the "Z" button. The base radio will scan to the 1st NOAA frequency where a broadcast is present. The display will light a single segment to indicate the NOAA frequency per FIG-6. If the base radio has been pre-set for your local NOAA weather frequency, the base radio will go directly to that frequency when the "Z" button is 1st pressed.
- With any subsequent press of the "Z" button the base radio will scan to the next active NOAA frequency.
- When the "Z" button is programmed to access NOAA Weather, the feature will no longer be accessible with the Channel Selector button.

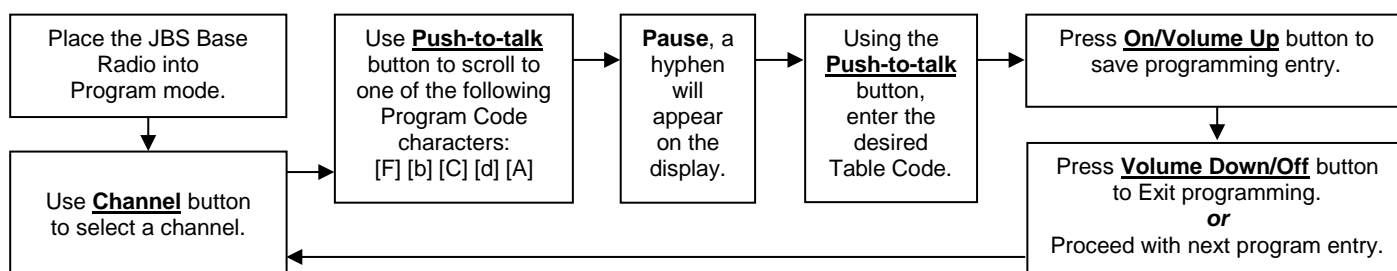
To return to a normal talk channel operation, press the Channel Selector button. The base radio will return to the last talk channel you operated on.

NOAA Weather Radio (NWR) is a nationwide network of radio stations broadcasting continuous weather information direct from a nearby National Weather Service office. NWR broadcasts National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day.

Working with the Federal Communication Commission's (FCC) Emergency Alert System, NWR is an "all hazards" radio network, making it your single source for comprehensive weather and emergency information. NWR also broadcasts warning and post-event information for all types of hazards—both natural (such as earthquakes and volcano activity) and environmental (such as chemical releases or oil spills).

Known as the "Voice of the National Weather Service," NWR is provided as a public service by the National Oceanic & Atmospheric Administration (NOAA), part of the Department of Commerce. NWR includes more than 750 transmitters, covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. NWR requires a special radio receiver or scanner capable of picking up the signal. Broadcasts are found in the public service band at these seven frequencies (MHz): 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, 162.550.

JBS FIELD PROGRAMMING OVERVIEW

**Program Codes****Table Codes**

Enter a 2-digit or 3-digit Frequency code from Table 1.



Enter a 2-digit Quiet Call code from Table 2 or a 3-digit Digital Quiet Call code from Table 3.

**For 2-Tone, DTMF or Selcall Encode (Transmit):**

Enter a 2-digit, 2-Tone Paging code from Table 4 **or**

Enter a **1** plus any 3–9 digit DTMF Code **or**

Enter a **2** plus any 3–7 digit Selcall Code

**For 2-Tone, DTMF or Selcall Decode (Receive):**

Enter a 2-digit, 2-Tone Paging code from Table 4 **or**

Enter **1** plus any 3–7 digit DTMF Code **or**

Enter **2** plus any 3–7 digit Selcall Code

Enter 3-digit Features Codes

**Enter any 2-digit or 3-digit Advanced Feature code from Table 5 to:**

- Enable or disable Channel Scanning.
- Enable or disable Weather Features (VHF Only)
- Set Z button operation for Scan, Weather (VHF Only), Monitor, Call Tone; or to transmit the 2-Tone, DTMF or Selcall Code programmed into the selected channel.
- Set radio to turn on to Channel 1.
- Set Call Tone Level to High or Low.
- Enable or disable Busy Channel TX Inhibit.
- Enable or disable TX and RX Beeps.
- Enable or disable DTMF or Selcall ANI on PTT.
- Enable or disable Monitor Lockout.
- Reset JBS Base Radio to Factory default programming.
- Readout codes currently programmed into the JBS.

HOW TO READOUT FIELD PROGRAMMABLE FREQUENCY & TONE CODES

In our example, channel 3 of a UHF base radio is programmed to operate on the "Brown Dot" frequency of 464.500 MHz with 100.0 Hz tone, and to transmit 2-Tone Code 94 frequencies of 389.0 and 669.9 Hz.

1. Place the radio into Program / Readout Mode by following the instructions in FIG-7 at right. A "P" will appear on the LED display as you enter program mode.

2. Release the **Push-to-talk** button after the beeping has stopped. The radio will display a series of six characters for Radio Identification, with each character separated by a hyphen. The 1st two characters indicate the model number, the 3rd and 4th characters indicate the radio type, and the 5th and 6th characters indicate the firmware revision.

In this example: Model: 05
 Radio Type: 37
 Firmware Revision: 01

3. After the Radio Identification has been displayed the digit 1 will appear, followed by a hyphen, and the radio will emit a triple beep indicating that the radio is in Program / Readout Mode and channel 1 is selected.

4. Press the **Channel Selector** button to select the channel to be read out. The channel number will show briefly on the channel display as you step through the channels. When you have settled on a channel the display will show a hyphen to indicate that it is ready for readout.

5. Press and release the **On/Volume Up** button. The radio will begin to display a series of digits; with each digit separated by a hyphen.

6. The radio will first display Program Code "F", followed by the 2 or 3-digit frequency code (see [Table 1](#)).
 If the channel is PC-programmed for any frequency not listed in [Table 1](#), an error tone will sound and an "E" will appear on the display.

7. The radio will next display Program Code "b", followed by a 2-digit tone code or 3-digit DQC code. See [Table 2](#) for tone codes or [Table 3](#) for DQC codes.

8. If the radio has been programmed for 2-Tone, DTMF or Selcall encode, Program Code "C" will be displayed, followed by the encode programming. Refer to [Table 4](#) for 2-Tone, DTMF or Selcall codes.

9. Repeat Steps 4-8 to readout additional channels. Once you have completed channel readout, press the **VOLUME DOWN/OFF** button to turn the radio off. Turn the radio back on for normal operation.

IMPORTANT
 To talk to other users in your group, all radios must be set to the same frequency and tone codes.

FIG-7: HOW TO PLACE THE RADIO IN PROGRAM / READOUT MODE

HOW TO FIELD PROGRAM FREQUENCY & TONE CODES

To match other radios, the owner can select Frequency, Tone and DQC Codes from [Table 1](#), [Table 2](#) and [Table 3](#). In our example, channel 3 of a UHF base radio is programmed to operate on the "Brown Dot" frequency of 464.500 MHz with 100.0 Hz tone.















- | | |
|--|---|
| 22
12 | 1. Refer to Table 1 to determine the 2 or 3-digit frequency code and write it down.
2. Refer to Table 2 to determine the 2-digit tone code for 100.0 Hz and write it down. |
| | 3. Place the radio into Program / Readout Mode by following the instructions in FIG-7 . A "P" will appear on the LED display as you enter program mode. If the radio is already in Program / Readout Mode proceed with programming starting at Step 6. |
| | 4. Release the Push-to-talk button after the beeping has stopped. The radio will display a series of six characters for Radio Identification, with each character separated by a hyphen. The 1st two characters indicate the model number, the 3rd and 4th characters indicate the radio type, and the 5th and 6th characters indicate the firmware revision.
In this example: Model: 05
Radio Type: 37
Firmware Revision: 01 |
|  | 5. After the Radio Identification has been displayed the digit 1 will appear, followed by a hyphen, and the radio will emit a triple beep indicating that the radio is in program mode and channel 1 is selected. |
|  | 6. Press the Channel Selector button to select the channel to be programmed. The channel number will show briefly on the channel display as you step through the channels. When you have settled on a channel the display will show a hyphen to indicate that it is ready for programming. |
|  | 7. Click the Push-to-talk button until the program display shows the Program Code "F". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the 2 or 3-digit Frequency code from Table 1. |
| FREQUENCY CODE

 | 8. Enter the 1 st digit of the frequency code by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 9. Enter the 2 nd digit of the frequency code by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 10. If necessary, enter the 3 rd digit of the frequency code by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit |
| 
 | 11. Press and release the ON/VOLUME UP button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.
NOTE: An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter. This will also occur if the radio frequency has been PC programmed to something other than one of the table codes from Table 1. |
|  | 12. Click the Push-to-talk button until the program display shows the Program Code "b". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the 2-digit Quiet-Call code or 3-digit Digital Quiet-Call code from Table 2 or Table 3. |
| TONE CODE

 | 13. Enter the 1 st digit of the tone code (or 1 st digit of the DQC code) by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 14. Enter the 2 nd digit of the tone code (or 2 nd digit of the DQC code) by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| 
 | 15. FOR DQC CODES ONLY – Enter the 3 rd digit of the DQC code by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| 
 | 16. Press and release the ON/VOLUME UP button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.
NOTE: An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter. |
| 17. Repeat Steps 6-16 to program additional channels. Once you have made your final program entry, press the VOLUME DOWN/OFF button to turn the radio off. Turn the radio back on for normal operation. | |

TABLE 1: PROGRAMMABLE FREQUENCY CODES

UHF Business Band Models			
Code	Frequency	Color Dot	BW
09	469.2625		12.5 †
10	462.5750	White Dot	12.5 †
11	462.6250	Black Dot	12.5 †
12	462.6750	Orange Dot	12.5 †
13	464.3250		12.5 †
14	464.8250		12.5 †
15	469.5000		12.5 †
16	469.5500		12.5 †
17	463.2625		12.5 †
18	464.9125		12.5 †
19	464.6000		12.5 †
20	464.7000		12.5 †
21	462.7250		12.5 †
22	464.5000	Brown Dot	12.5
23	464.5500	Yellow Dot	12.5
24	467.7625	J	12.5
25	467.8125	K	12.5
26	467.8500	Silver Star	12.5
27	467.8750	Gold Star	12.5
28	467.9000	Red Star	12.5
29	467.9250	Blue Star	12.5
30	461.0375		12.5
31	461.0625		12.5
32	461.0875		12.5
33	461.1125		12.5
34	461.1375		12.5
35	461.1625		12.5
36	461.1875		12.5
37	461.2125		12.5
38	461.2375		12.5
39	461.2625		12.5
40	461.2875		12.5
41	461.3125		12.5
42	461.3375		12.5
43	461.3625		12.5
44	462.7625		12.5
45	462.7875		12.5
46	462.8125		12.5
47	462.8375		12.5
48	462.8625		12.5
49	462.8875		12.5
50	462.9125		12.5
51	464.4875		12.5
52	464.5125		12.5
53	464.5375		12.5
54	464.5625		12.5
55	466.0375		12.5
56	466.0625		12.5
57	466.0875		12.5
58	466.1125		12.5
59	466.1375		12.5
60	466.1625		12.5
61	466.1875		12.5
62	466.2125		12.5
63	466.2375		12.5
64	466.2625		12.5
65	466.2875		12.5
66	466.3125		12.5

UHF Business Band Models			
Code	Frequency	Color Dot	BW
67	466.3375		12.5
68	466.3625		12.5
69	467.7875		12.5
70	467.8375		12.5
71	467.8625		12.5
72	467.8875		12.5
73	467.9125		12.5
74	469.4875		12.5
75	469.5125		12.5
76	469.5375		12.5
77	469.5625		12.5
78	462.1875		12.5
79	462.4625		12.5
80	462.4875		12.5
81	462.5125		12.5
82	467.1875		12.5
83	467.4625		12.5
84	467.4875		12.5
85	467.5125		12.5
86	451.1875		12.5
87	451.2375		12.5
88	451.2875		12.5
89	451.3375		12.5
90	451.4375		12.5
91	451.5375		12.5
92	451.6375		12.5
93	452.3125		12.5
94	452.5375		12.5
95	452.4125		12.5
96	452.5125		12.5
97	452.7625		12.5
98	452.8625		12.5
99	456.1875		12.5
100	456.2375		12.5
101	456.2875		12.5
102	468.2125		12.5
103	468.2625		12.5
104	468.3125		12.5
105	468.3625		12.5
106	468.4125		12.5
107	468.4625		12.5
108	468.5125		12.5
109	468.5625		12.5
110	468.6125		12.5
111	468.6625		12.5
112	456.3375		12.5
113	456.4375		12.5
114	456.5375		12.5
115	456.6375		12.5
116	457.3125		12.5
117	457.4125		12.5
118	457.5125		12.5
119	457.7625		12.5
120	457.8625		12.5
121	Do not use		
122	464.8375		12.5
00	Delete Code *		

VHF Business Band Models			
Code	Frequency	Color Dot	BW
03	151.6250	Red Dot	12.5 †
04	151.9550	Purple Dot	12.5 †
05	151.9250		12.5 †
06	154.5400		12.5 †
07	154.5150		12.5 †
08	154.6550		12.5 †
09	151.6850		12.5 †
10	151.7150		12.5 †
11	151.7750		12.5 †
12	151.8050		12.5 †
13	151.8350		12.5 †
14	151.8950		12.5 †
15	154.4900		12.5 †
16	151.6550		12.5 †
17	151.7450		12.5 †
18	151.8650		12.5 †
24	151.7000		12.5
25	151.7600		12.5
26	152.7000		12.5 †
27	152.8850		12.5
28	152.9150		12.5
29	152.9450		12.5
30	151.5125		12.5
31	154.5275		12.5
32	153.0050		12.5
33	158.4000		12.5
34	158.4075		12.5
00	Delete Code*		

VHF MURS Models**			
Code	Frequency	Color Dot	BW
01	154.600	Green Dot	25.0
02	154.570	Blue Dot	25.0
19	151.820	MURS	12.5
20	151.880	MURS	12.5
21	151.940	MURS	12.5
22	154.600	MURS	12.5
23	154.570	MURS	12.5
00	Delete Code*		

Notes			
* Code 00 will delete the channel, it will not be available with the channel button.			
** MURS models do not require an FCC license. All other models require an FCC license.			
† Frequency code was 25 kHz BW prior to the 2013 FCC Narrowband Mandate.			
• BW is the bandwidth in kHz.			
• 12.5 kHz indicates narrow band channel, 25 kHz indicates wide band channel.			
• If the radio has been PC programmed to a non-table frequencies it cannot be changed via field programming. Code 999 will appear when read out.			

CANADIAN FREQUENCY CODES

<i>Canada Models UHF Business Band</i>			
Code	Frequency	Color Dot	BW
01	458.6625		25
02	469.2625		25

<i>Canada Models VHF Business Band</i>			
Code	Frequency	Color Dot	BW
01	151.055		25
02	151.115		25

<i>JBS/PBS-447D-CANADA-GMRS UHF GMRS</i>			
Code	Frequency	Service	BW
01	462.5625	GMRS	12.5
02	462.5875	GMRS	12.5
03	462.6125	GMRS	12.5
04	462.6375	GMRS	12.5
05	462.6625	GMRS	12.5
06	462.6875	GMRS	12.5
07	462.7125	GMRS	12.5

<i>JBS/PBS-447D-CANADA-GMRS UHF GMRS</i>			
Code	Frequency	Service	BW
15	462.5500	GMRS	12.5
16	462.5750	GMRS	12.5
17	462.6000	GMRS	12.5
18	462.6250	GMRS	12.5
19	462.6500	GMRS	12.5
20	462.6750	GMRS	12.5
21	462.7000	GMRS	12.5
22	462.7250	GMRS	12.5

NOTE: JBS/PBS-447D-CANADA-GMRS are license free radios that can only operate on the GMRS table frequencies.

TABLE 2: PROGRAMMABLE QC TONE CODES

Code	Frequency	Code	Frequency	Code	Frequency	Code	Frequency
01	67.0	14	107.2	27	167.9	40	159.8
02	71.9	15	110.9	28	173.8	41	165.5
03	74.4	16	114.8	29	179.9	42	171.3
04	77.0	17	118.8	30	186.2	43	177.3
05	79.7	18	123.0	31	192.8	44	No Tone
06	82.5	19	127.3	32	203.5	45	183.5
07	85.4	20	131.8	33	210.7	46	189.9
08	88.5	21	136.5	34	218.1	47	196.6
09	91.5	22	141.3	35	225.7	48	199.5
10	94.8	23	146.2	36	233.6	49	206.5
11	97.4	24	151.4	37	241.8	50	229.1
12	100.0	25	156.7	38	250.3	51	254.1
13	103.5	26	162.2	39	69.4	00	No Tone

TABLE 3: PROGRAMMABLE DIGITAL DQC TONE CODES

Code	Code	Code	Code	Code	Code	Code	Code
023	072	152	244	311	412	466	631
025	073	155	245	315	413	503	632
026	074	156	246	325	423	506	645
031	114	162	251	331	431	516	654
032	115	165	252	332	432	523	664
036	116	172	255	343	445	532	703
043	122	174	261	346	446	546	712
047	125	205	263	351	452	565	723
051	131	212	265	356	454	606	731
053	132	223	266	364	455	662	732
054	134	225	271	365	462	612	734
065	143	226	274	371	464	624	743
071	145	243	306	411	465	627	754

HOW TO FIELD PROGRAM 2-TONE, DTMF OR SELCALL ENCODE (TRANSMIT) OPERATION

For special applications the JBS Base Radio can be programmed to transmit a 2-Tone, DTMF or Selcall code when the Z button is pressed. The user is able to field program the radio for one of the 9 pre-determined 2-Tone pairs specified in [Table 4](#), for any 3-9 digit DTMF, or 3-7 digit Selcall sequence. In our example we will program channel 3 of a UHF JBS radio to operate with 2-Tone Code 94 frequencies of 389.0 and 669.9 Hz.

NOTE: The radio must be programmed for Z Button DTMF/2-Tone/Selcall. See [How to Field Program Advanced Feature Codes](#) for details.

- | | |
|--|--|
| <div style="text-align: center;">94</div> <div style="text-align: center;">P</div> <div style="text-align: center;">0-1-5-1
3-7-7-7
0-1-1-1</div> <div style="text-align: center;">1-1</div> <div style="text-align: center;">3-1</div> <div style="text-align: center;">0-1</div> <div style="text-align: center;">1-1</div> <div style="text-align: center;">2-1</div> <div style="text-align: center;">9-1
4-1</div> <div style="text-align: center;">1-1
E</div> | <ol style="list-style-type: none"> 1. Write down the desired 2-Tone, DTMF or Selcall ANI code. 2. Place the radio into Program / Readout Mode by following the instructions in FIG-7. A "P" will appear on the LED display as you enter program mode. If the radio is already in Program / Readout Mode proceed with programming starting at Step 5. 3. Release the Push-to-talk button after the beeping has stopped. The radio will display a series of six characters for Radio Identification, with each character separated by a hyphen. The 1st two characters indicate the model number, the 3rd and 4th characters indicate the radio type, and the 5th and 6th characters indicate the firmware revision.

In this example: Model: 05
 Radio Type: 37
 Firmware Revision: 01 4. After the Radio Identification has been displayed the digit 1 will appear, followed by a hyphen, and the radio will emit a triple beep indicating that the radio is in program mode and channel 1 is selected. 5. Press the Channel Selector button to select the channel to be programmed. The channel number will show briefly on the channel display as you step through the channels. When you have settled on a channel the display will show a hyphen to indicate that it is ready for programming. 6. Click the Push-to-talk button until the program display shows the Program Code "C". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 2-digit 2-Tone code from Table 4, a 3 to 9-digit DTMF, or 3 to 7-digit Selcall decode sequence. 7. TO REMOVE 2-TONE, DTMF OR SELCALL PROGRAMMING – Enter a "0" using the Push-to-talk button. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Proceed to Step 13 to save this programming change. 8. FOR DTMF CODES ONLY – Enter a "1" using the Push-to-talk button. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. 9. FOR SELCALL CODES ONLY – Enter a "2" using the Push-to-talk button. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. 10. Enter the 1st digit of the 2-Tone code (or 1st digit of the DTMF or Selcall code) by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. 11. Enter the 2nd digit of the 2-Tone code (or 2nd digit of the DTMF or Selcall code) by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. 12. FOR DTMF OR SELCALL CODES ONLY – Enter the 3rd digit of the DTMF or Selcall decode sequence. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Continue entering up to nine digits for DTMF, or seven digits for Selcall. 13. Press and release the ON/VOLUME UP button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.

NOTE: An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter. 14. Repeat Steps 5-13 to program additional channels. Once you have made your final program entry, press the VOLUME DOWN/OFF button to turn the radio off. Turn the radio back on for normal operation. |
|--|--|

2-TONE, DTMF OR SELCALL CODE

HOW TO FIELD PROGRAM 2-TONE, DTMF OR SELCALL DECODE (RECEIVE) OPERATION

For special applications, it is desirable to program the JBS Base Radio for 2-Tone, DTMF or Selcall decode (receive) operation. The user is able to field program the radio for one of the 9 pre-determined 2-Tone pairs specified in [Table 4](#), or for any 3-7 digit DTMF or Selcall sequence. The 2-Tone codes correspond to field programmable 2-Tone encode (transmit) codes available in other RITRON products.

In the following example we will program channel 3 of a UHF radio for paging operation with 2-Tone Decode Code 94 frequencies of 389.0 and 669.9 Hz with Ring Tone enabled.

- | | |
|--|---|
| | 1. Place the radio into Program / Readout Mode by following the instructions in FIG-7 . A "P" will appear on the LED display as you enter program mode. If the radio is already in Program / Readout Mode proceed with programming starting at Step 4. |
| | 2. Release the Push-to-talk button after the beeping has stopped. The radio will display a series of six characters for Radio Identification, with each character separated by a hyphen. The 1st two characters indicate the model number, the 3rd and 4th characters indicate the radio type, and the 5th and 6th characters indicate the firmware revision.

In this example: Model: 05
Radio Type: 37
Firmware Revision: 01 |
| | 3. After the Radio Identification has been displayed the digit 1 will appear, followed by a hyphen, and the radio will emit a triple beep indicating that the radio is in program mode and channel 1 is selected. |
| | 4. Press the Channel Selector button to select the channel to be programmed. The channel number will show briefly on the channel display as you step through the channels. When you have settled on a channel the display will show a hyphen to indicate that it is ready for programming. |
| | 5. Refer to Table 4 to determine the two-digit code for 2-tone decode on 389.0 and 669.9 Hz. |
| | 6. Click the Push-to-talk button until the program display shows the Program Code "d". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 2-digit 2-Tone code from Table 4, or a 3 to 7-digit DTMF or Selcall decode sequence. |
| | 7. TO REMOVE 2-TONE, DTMF OR SELCALL PROGRAMMING – Enter a "0" using the Push-to-talk button. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Proceed to Step 13 to save this programming change. |
| | 8. FOR DTMF CODES ONLY – Enter a "1" using the Push-to-talk button. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 9. FOR SELCALL CODES ONLY – Enter a "2" using the Push-to-talk button. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 10. Enter the 1 st digit of the 2-Tone code (or 1 st digit of the DTMF or Selcall code) by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 11. Enter the 2 nd digit of the 2-Tone code (or 2 nd digit of the DTMF or Selcall code) by clicking the Push-to-talk button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. |
| | 12. FOR DTMF OR SELCALL CODES ONLY – Enter the 3 rd digit of the DTMF or Selcall decode sequence. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit. Continue entering up to seven digits. |
| | 13. Press and release the ON/VOLUME UP button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.

NOTE: An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter. |
| | 14. Refer to Table 4 to determine the 3-digit Features code to enable Ring Tone. |
| | 15. Click the Push-to-talk button until the program display shows the Program Code "d". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next programming code. |

2-TONE, DTMF, OR SELCALL CODE

HOW TO FIELD PROGRAM 2-TONE, DTMF OR SELCALL DECODE (RECEIVE) OPERATION (CONTINUED)

16. Enter the 1st digit of the Features Code by clicking the **Push-to-talk** button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
17. Enter the 2nd digit of the Features Code by clicking the **Push-to-talk** button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
18. Enter the 3rd digit of the Features Code by clicking the **Push-to-talk** button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
19. Press and release the **ON/VOLUME UP** button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.
- NOTE:** An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
20. Repeat Steps 4-19 to program additional channels. Once you have made your final program entry, press the **VOLUME DOWN/OFF** button to turn the radio off. Turn the radio back on for normal operation.

IMPORTANT NOTES:

1. Your Ritron dealer can PC program the JBS Base Radio for additional features associated with the 2-tone, DTMF or Selcall decode function. Contact your Ritron dealer for details.
2. When the JBS Base Radio is programmed for 2-Tone Decode operation, it is recommended that you do NOT use QC Tone Codes greater than "23" (146.2 Hz).

TABLE 4: 2-TONE, DTMF AND SELCALL CODES

Code	Feature	Key	Description
Remove 2-Tone, DTMF or Selcall Programming			
0	Delete	✓	Remove all 2-Tone, DTMF or Selcall programming.
2-Tone Codes			
90	See Note	See Note	<ul style="list-style-type: none">• If the radio displays 2-Tone Code “90” on readout it has been programmed for custom frequencies.• When the radio is programmed for 2-Tone Decode operation, it is recommended that you do NOT use QC Tone Codes greater than “23” (146.2 Hz).
91	330.5	569.1	
92	349.0	600.9	
93	368.5	634.5	
94	389.0	669.9	
95	410.8	707.3	
96	433.7	746.8	
97	457.9	788.5	
98	483.5	832.5	
99	330.5	600.9	
DTMF and Selcall Codes			
1 + xxx	DTMF		Enter “1” and 3-7 DTMF digits (0123456789)
2 + xxx	Selcall		Enter “2” and 3-7 Selcall digits (0123456789)
2-Tone, DTMF or Selcall Decode Features			
510	Ring Tone OFF		No Ring signal on decode.
511	Ring Tone ON	✓	Radio will sound a Ring signal in the speaker upon decode.
520	Transpond OFF		No Transpond transmission on decode.
521	Transpond ON	✓	Radio will transmit a Transpond tone to acknowledge decode.
530	Decode without subtone	✓	Decode with or without subtone present.
531	Decode with subtone		Only decodes with the correct subtone present.
540	Auto Reset Disabled		After decoding the radio will operate in normal squelch mode until it is manually placed back into Decode Mode*.
541	Auto Reset Enabled	✓	Radio automatically resets Decode Mode* after 10 seconds of inactivity.
550	Monitor Trip Disabled	✓	After decoding the radio requires subtone for 2-way communication.
551	Monitor Trip Enabled		Radio is automatically set to monitor squelch mode after 2-Tone, DTMF or Selcall decode. Radio will not require subtone for 2-way communication until Decode Mode* has been reset.
560	Squelch on Select Disabled		Radio does not go into Decode Mode* on channel selection, Decode Mode* must be manually set.
561	Squelch on Select Enabled	✓	Radio is automatically placed in Decode Mode* when the channel is selected.

KEY: √ The JBS Base Radio is set from the factory with these options **enabled**.

* Decode Mode requires 2-Tone, DTMF or Selcall decode to initiate normal 2-way communication. Once decoded the radio operates with normal 2-way communication until Decode Mode is reset.

HOW TO FIELD PROGRAM ADVANCED FEATURE CODES

The JBS Base Radio can be field programmed for a number of advanced features. Refer to [Table 5](#) for the two or three digit codes available for field programming. In our example we will program the radio for Z button 2-Tone encode operation.


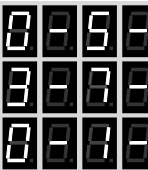








64	1. Refer to Table 5 to determine the two or three-digit Advanced Features code and write it down.
	2. Place the radio into Program / Readout Mode by following the instructions in FIG-7. A "P" will appear on the LED display as you enter program mode. If the radio is already in Program / Readout Mode proceed with programming starting at Step 5.
	3. Release the Push-to-talk button after the beeping has stopped. The radio will display a series of six characters for Radio Identification, with each character separated by a hyphen. The 1st two characters indicate the model number, the 3rd and 4th characters indicate the radio type, and the 5th and 6th characters indicate the firmware revision. In this example: Model: 05 Radio Type: 37 Firmware Revision: 01
	4. After the Radio Identification has been displayed the digit 1 will appear, followed by a hyphen, and the radio will emit a triple beep indicating that the radio is in program mode and channel 1 is selected.
	5. Press the Channel Selector button to select the channel to be programmed. The channel number will show briefly on the channel display as you step through the channels. When you have settled on a channel the display will show a hyphen to indicate that it is ready for programming. If the Advanced Feature code to be programmed is radio wide this step can be skipped.
	6. Click the Program button until the program display shows the Program Code "A". Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept a 2-digit or a 3-digit Feature code.
	7. Enter the 1 st digit of the feature code by clicking the Program button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	8. Enter the 2 nd digit of the feature code (if necessary) by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	9. Enter the 3 rd digit of the feature code (if necessary) by clicking the Program button until the program display shows the desired number. Pause—the radio sounds a low tone and will show a hyphen across the center of the display to indicate that it is ready to accept the next digit.
	10. Press and release the ON/VOLUME UP button to save your programming. A triple beep will sound to indicate that programming was successful and a hyphen will appear on the program display. The radio is now ready for another program entry.
	NOTE: An error tone will sound if you attempt to save an incorrect code, an "E" will appear on the display. Check the digits you are attempting to enter, then re-enter.
11. Repeat Steps 5-10 to program additional Advanced Features. Once you have made your final program entry, press the VOLUME DOWN/OFF button to turn the radio off. Turn the radio back on for normal operation.	

TABLE 5: ADVANCED FEATURE CODES

Code	Feature	Key	Description
Radio Wide Features			
2x	Turn On Volume		Radio turns on to volume level x. (x = 0-9)
30	Disable Channel Scan		Disables Channel Scanning.
31	Enable Channel Scan	√	Enables Channel Scanning.
40	Disable Weather Channel		Disables Weather Channel on VHF radios only.
41	Enable Weather Channel	√	Enables Weather Channel on VHF radios only.
50	Disable Weather Alert	√	Disables Weather Alert on VHF radios only.
51	Enable Weather Alert		Enables Weather Alert on VHF radios only.
60	Z Button Scan	√	Z button enables channel scanning.
61	Z Button Weather		Z button enables weather channel.
62	Z Button Monitor		Z button toggles receiver between carrier squelch and tone squelch.
63	Z Button Call Tone		Z button transmits a Call Tone.
64	Z Button DTMF/2-Tone/Selcall		Z Button transmits DTMF, Selcall or 2-Tone code programmed into the selected channel.
70	Turn On to Channel 1 Disabled	√	When radio is turned on it will go to last channel used.
71	Turn On to Channel 1 Enabled		When radio is turned on it will go to Channel 1.
91	Call Tone Low	√	With Z Button set for Call Tone, Call Tone will be transmitted at a low level.
92	Call Tone High		With Z Button set for Call Tone, Call Tone will be transmitted at a high level.
Per Channel Features			
110	High Power	√	
111	Low Power		
120	Busy Channel TX Inhibit Disable	√	
121	Busy Channel TX Inhibit Enable		Prevents TX if a signal is present on the receiver.
130	RX Beep Disable	√	
131	RX Beep Enable		Beep at the end of a received message.
140	TX Beep Disable	√	
141	TX Beep Enable		Beep when radio is ready for user to talk.
150	ANI on PTT Disable	√	
151	ANI on PTT Enable		DTMF or Selcall ANI will be sent on PTT press.
160	Monitor Lockout Disable	√	
161	Monitor Lockout Enable		Prevents monitoring channel, only message with correct tone codes will be heard.
170	Scan Resume Delay Disable		
171	Scan Resume Delay Enable	√	If a signal is received while scanning, radio will remain on the channel for a period of time after the received signal is gone before scanning is resumed.
Programming Readout Codes			
81	Frequency Code		Display will sequentially show the programmed 2 or 3-digit Frequency Code. (1)
82	QC or DQC Tone Code		Display will sequentially show the programmed 2-digit QC Tone Code or 3-digit DQC Tone Code. (2)
83	2-Tone, DTMF or Selcall Encode Code		Display will sequentially show the programmed 2-digit 2-Tone Code, the 3 to 9-digit DTMF, or 3 to 7-digit Selcall Code
84	2-Tone, DTMF or Selcall Decode Code		Display will sequentially show the programmed 2-digit 2-Tone Code, or the 3 to 7-digit DTMF or Selcall Code
89	Reset to Factory Defaults		Resets the JBS base radio to Factory default programming. Channel 1 and 2 are reset to factory default, channels 3-10 are deleted.

KEY: √ The JBS Base Radio is set from the factory with these options **enabled**.

NOTES:

- (1) 999 indicates a non-table frequency or that TX and RX are not the same
- (2) If the RX and TX tone codes are not the same, or if DCS is inverted you will get an ERROR indication
- (4) ERROR indication will be displayed if not a Field Programming value (has been PC programmed)

PC PROGRAMMABLE JBS BASE RADIO FEATURES

The JBS Base Radio has a variety of programmable features that determine how your radio operates. Many of these features can be Field Programmed (FP) by you without using special tools, while other features can only be Programmed (PC) with a PC and Ritron Programming software JBS-PCPS-1.0 or higher. Contact your Ritron dealer or the factory for details.

TABLE 6: PC PROGRAMMABLE FEATURES

Radio Wide Features available with the Radio Personality menu selection

Feature	Key	Description
Field Programming Enable		This option is ENABLED as the Factory Default setting. This permits all Field Programmable features (FP) to be field programmed by you. If DISABLED , the features can only be programmed using special Ritron PC Programming software.
Z Button Function	√	The Z button can be set for one of the following five functions: <ul style="list-style-type: none"> • Channel Scan enables channel scanning. • NOAA Weather (VHF Only) enables the weather channel. • Channel Monitor toggles receiver between carrier squelch and tone squelch. • Call Tone transmits a call tone. • Encode DTMF/2-Tone/Selcall transmits a DTMF, Selcall or 2-Tone code programmed into the selected channel
Turn on to Volume	√	The Factory Default setting is volume level 4. Field Programming or PC Programming allows any volume level between 0 – 9. If Turn on to Volume is not selected the radio will turn on at the lowest volume level 0.
Constant Beep Volume		A Constant Beep Volume can be set for any volume level between 0 – 9. If not selected the Beep Volume will be the same as the volume set by the On/Volume Up and Volume Down/Off buttons.
TX Time Out Time		Set from the factory for 60 seconds, the TX Time Out Time can be PC programmed for 1-255 seconds. This sets the length of time the JBS Base Radio can transmit continuously. If the Push-to-Talk button is held down longer then the TX Time Out Time will allow, the radio will stop transmitting and a "Busy Signal" will be heard in the speaker until the button is released..
Turn on to Channel 1	√	The JBS Base Radio can be set to always turn on to Channel 1, otherwise it will turn on to the channel that was selected when the radio was last turned off.
Call Tone	√	If the Z button has been set for Call Tone the level can be set for High or Low. The duration of the Call Tone can be set for 0.5-8 seconds via PC programming only. The default duration is 1.5 seconds.
Weather Features	√	The following 4 weather features can be set on VHF Radios Only : <ul style="list-style-type: none"> • Weather Frequency Select Mode Enable allows Field Programming of the weather channel. • Weather Channel Enable makes the weather channel available using the Channel button. • Weather Alert Enable cause the radio to listen for emergency broadcasts from the National Weather Service, regardless of which channel you are on. • NOAA Weather Frequency sets the weather frequency the radio will operate on when using any of the weather features.

KEY: √ Feature is Field Programmable.

TABLE 6: PC PROGRAMMABLE FEATURES (CONTINUED)**Features programmable on each radio channel**

Feature	Key	Description
Frequency Table	√	Sets the radio transmitter and receiver to a frequency selected from a table.
RX Frequency		The receive frequency will be automatically set to the table frequency, or can be set to any unique frequency within the radio band. (150-162MHz VHF, 450-470MHz UHF). License-free models can only be programmed to the table frequencies.
RX Quiet Call (QC) and Digital Quiet Call (DQC)	√	Each channel can be programmed from a list of 50 QC sub-audible or 104 DQC digital privacy codes.
DQC Decode Polarity Invert		If programmed for DQC, the code can be inverted.
Squelch Tightener		Squelch setting can be adjusted for each channel.
Paging Decode		Each channel can be set for a unique 2-Tone, DTMF or Selcall paging decode.
RX Courtesy Beep	√	In high noise environments it is sometimes difficult to determine when a received message has ended. With the RX Courtesy Beep enabled a short beep will be heard on the speaker at the end of each received transmission.
Monitor LockOut	√	For channels using QC or DQC decode, Monitor LockOut prevents the user from listening to any received signals that do not have the programmed QC or DQC code.
Receive Only		Receive Only eliminates transmit capability on the channel.
Scan Resume Delay Enable	√	If the channel is received when in scan mode, the radio will remain on the channel for a period of time after the received signal is gone before reverting back to scan mode.
TX Frequency		The transmit frequency will be automatically set to the table frequency, or can be set to any unique frequency within the radio band. (150-162MHz VHF, 450-470MHz UHF). License-free models can only be programmed to the table frequencies.
TX Quiet Call (QC) and Digital Quiet Call (DQC)	√	Each channel can be programmed from a list of 50 QC sub-audible or 104 DQC digital privacy codes.
DQC Decode Polarity Invert		If programmed for DQC, the code can be inverted.
High / Low Power		The channel can be set for high or low transmit power.
TX Inhibit on Busy Channel		The radio will not be able transmit if there is a received signal present on the channel.
Transmit Clear to Talk Beep		This feature provides a short beep in the radio speaker any time the Push-to-talk button is pressed. This assures the user that the radio is ready to transmit their message.
Paging Encode		Each channel can be set to transmit a unique 2-Tone, DTMF or Selcall paging code whenever the Z button is pressed.
ANI on PTT		If the radio is set for DTMF or Selcall Paging Encode, the code will be sent every time the Push-to-Talk button is pressed.

KEY: √ Feature is Field Programmable.

2-TONE, DTMF OR SELCALL DECODE (RECEIVE) SETTINGS

2-Tone, DTMF or Selcall decode can be used to selectively call the radio in a system where multiple radios operate on a single frequency.

When the radio is programmed for 2-Tone, DTMF or Selcall Paging Decode code, no call will be heard unless the code has been successfully decoded or the **ON/PTT** button has been pressed. After decoding, normal 2-way conversation is possible without the need for the 2-tone, DTMF or Selcall code. Paging Decode can be automatically or manually reset.

NOTICE When the Base Radio is programmed for 2-Tone Decode operation, it is recommended that you do NOT use QC Tone Codes greater than "23" (146.2 Hz).

2-Tone, DTMF or Selcall Decode features programmable on each radio channel

Feature	Key	Description
2-Tone Table #	✓	The radio comes equipped with 9 pre-determined 2-Tone codes that correspond to table codes that certain RITRON portable and base radios can send. Use of the 2-Tone Table codes allows programming without the need for the PC programmer.
1st Tone decoded for duration <input type="text" value="1"/> sec.		You can custom program the 1 st tone of the 2-tone code to any frequency between 300-1500 Hz. The 1st tone must be decoded for the programmed period of time before the radio looks for the 2nd tone. The factory setting for decode time is 1 second.
2nd Tone decoded for duration <input type="text" value="1"/> sec.		You can custom program the 2nd tone of the 2-tone code to any frequency between 300-1500 Hz. The 2nd tone must be decoded for the programmed period of time after the 1st tone has been decoded. The factory setting for decode time is 1 second.
All Call decoded for duration <input type="text" value="4"/> sec.		With 2-Tone All Call enabled you can custom program an All Call tone to any frequency between 300-1500 Hz. The All Call tone must be decoded for the programmed period of time. All Call can also be achieved with a unique DTMF or Selcall code. All Call is not enabled as received from the factory.
Ring Tone Enable	✓	With this feature enabled the radio will sound a ring signal in the speaker, similar to a telephone ring, any time the 2-Tone, DTMF or Selcall code, Group Call or All Call code is decoded. Ring Tone is enabled from the factory.
Transpond Enable	✓	Transpond transmits a tone after a 2-Tone, DTMF or Selcall code, Group Call or All Call code has been received to alert the calling radio that the code was successfully decoded. Transpond is enabled from the factory.
Decode with Subtone	✓	With 2-Tone, DTMF or Selcall Decode with Subtone enabled, the radio will not decode codes unless the correct subtone is also present. 2-Tone, DTMF or Selcall Decode with Subtone is not enabled from the factory.
Monitor Trip	✓	With this option selected the radio will be in carrier squelch mode any time a 2-Tone, DTMF or Selcall code is decoded, regardless of any QC or DQC code programmed in the radio. The radio reverts back to QC or DQC tone decode if the Push-to-talk button is pressed and reverts back to 2-tone, DTMF or Selcall decode after Paging Decode is reset. Monitor Trip is not enabled from the factory.
Group Call		When this option is set, 2-tone decode is achieved if the radio receives the 1st tone for the programmed All Call time. If this option is selected the All Call time must be longer than the 1st Tone time or the radio will always decode on the 1st tone, ignoring the 2nd tone altogether. Group Call can also be achieved with a unique DTMF or Selcall code. Group Call is not enabled as received from the factory.
All Call		When this option is set, 2-tone decode is achieved if the radio receives the All Call tone for the programmed All Call time. All Call can also be achieved with a unique DTMF or Selcall code. All Call is not enabled as received from the factory.
Squelch on Channel Select	✓	With this option is set the radio is placed into 2-Tone, DTMF or Selcall decode mode any time the channel is selected.
Auto Reset	✓	When set the radio will automatically reset to 2-Tone, DTMF or Selcall decode mode after a period of inactivity greater than the programmed Reset Time. The Reset Time is set to 10 seconds by default, and is PC programmable only.

KEY: ✓ Feature is Field Programmable.

RITRON GATEGUARD® SYSTEMS

For special applications, it is possible to use your Ritron portable radio or base station for remote control applications; such as opening or closing a gate remotely (see Ritron GateGuard® at www.ritron.com/pdf/gg_07.pdf). This application requires you to program the base radio to send the command that will operate the gate, and a Ritron Callbox will receive the command and operate the gate.

Pre-packaged Ritron GateGuard® systems use 2-Tone signalling for the command codes, although DTMF or Selcall signalling can also be used. Whether using 2-Tone, DTMF or Selcall the codes must match.

The user can field program each channel to encode one of the 9 pre-set 2-Tone codes specified in Table 5, encode a 3-9 digit DTMF, or 3-7 digit Selcall code. These codes correspond to field programmable 2-Tone, DTMF or Selcall Decode Codes available in the Ritron Callbox.

To program the base radio for GateGuard® operation:

1. Program the desired base radio channel with the frequency and tone used in the Callbox.
2. Program the base radio for 2-Tone or DTMF/Selcall "Z" Button operation.
3. Program the desired base radio channel to encode the 2-Tone, DTMF or Selcall code used in the Callbox.
4. Enter the 1st digit of the 2-Tone code by clicking the PTT button until the program display shows the desired number. Pause—the radio will sound a low tone and show a hyphen across the display to indicate that it is ready to accept the next digit.
5. Turn the base radio OFF and then ON again for normal operation. The "Z" Button can now be used to send the 2-Tone, DTMF or Selcall Code.

**JBS-147D-A and JBS-447D-A
AUTO TURN ON WHEN POWER RESTORED**

Ritron models JBS-147D-A and JBS-447D-A have been built to operate any time power is applied to the base radio, eliminating the need to press the On/Volume Up button to turn the radio on.

The JBS-147D-A and JBS-447D-A model base radios

- Will turn on any time power is applied to the radio, allowing it to automatically turn back on after a power failure.
- Will store the current channel in EEPROM each time the channel is changed, assuring that the radio will automatically restart to the current operating channel after a power outage. As an alternative, the radio can be programmed to turn on to channel 1 whenever power is applied.
- Will not turn-off by pressing the Volume Down/Off button. The only way to turn the radio off is to remove power.
- Will restart to a mid volume level after a power outage. As an alternative, the base radio can be programmed to turn on to any volume level from 0-9.
- Will not turn-off as a result of a low battery condition, therefore, the JBS-147D-A is not recommended for battery powered applications.
- Requires Ritron PC Programmer JBS-PCPS 1.0.1 or higher.

To place the JBS-147D-A or JBS-447D-A into field programming mode

1. Remove power from the JBS-147D-A or JBS-447D-A base radio.
2. Hold down the PTT button and re-apply power.
3. Continue to hold the PTT until the beeping has stopped, then release.
4. The radio will display a series of six characters for Radio Identification, then a triple beep will be heard indicating that the JBS-147D-A or JBS-447D-A base radio is in program mode.
5. When programming is complete, remove power and re-apply to return the radio to normal operating mode.

TROUBLESHOOTING CHART

If you have trouble operating the base radio, review the Control & Operation, pages 4 through 8. If you think the base radio is malfunctioning, check the list below.

Problem	Possible Solutions
GENERAL	
The radio does not work at all.	<ul style="list-style-type: none"> Make sure the 120 VAC outlet is active and the RPS-1B power supply is connected.
Operating features do not work exactly as expected.	<ul style="list-style-type: none"> The radio has been dealer programmed for customized operation. (Consult dealer.)
Reception is poor.	<ul style="list-style-type: none"> Move to a different location. (See Note 1.) Confirm the proper antenna is connected to the radio. Use an optional high-gain antenna. See page 2, Optional Replacement Accessories.
You cannot hear calls from other radios.	<ul style="list-style-type: none"> Turn off Quiet Call (coded) squelch. (See Note 2.) Ensure radio receives the same frequency the caller transmits. (See Note 3.)
Your calls cannot be heard in other radios.	<ul style="list-style-type: none"> Make sure that your radio transmits on the receive frequency of the radio(s) you want to call. (See Note 3.)
ERROR TONES	
An error tone sounds when the radio is first switched on.	<ul style="list-style-type: none"> See "Error Tones" on page 6.
An error tone occurs while transmitting.	<ul style="list-style-type: none"> Refer to "Transmitter Time-Out," page 6.
QUIET CALL	
You cannot screen out calls from users outside of your Quiet Call group.	<ul style="list-style-type: none"> Make sure that the channel is programmed with Quiet Call. Activate coded squelch. (See Note 5.)
You cannot hear Quiet Call messages while in Quiet Call (coded) squelch.	<ul style="list-style-type: none"> Confirm that the channel is programmed to detect the same code as the calling radio(s) transmits. (See Note 5.)
Others in your Quiet Call group cannot hear your Quiet Call messages.	<ul style="list-style-type: none"> Verify that you transmit the same code as the radio(s) you call are programmed to detect. (See Note 5.)
SCAN	
The radio constantly stops on a busy channel, preventing you from hearing calls on.	<ul style="list-style-type: none"> Skip over the interfering channel when scanning. See "Temporary Busy Channel Blocking" on page 6.

NOTES

- Reception can often be improved if you relocate by a short distance. This effect is more noticeable inside buildings.
 - The range of the "Display Series" base radio is approximately two miles, line-of-sight.
- If your radio does not detect calls from other radios on the channel, turn off Quiet Call by pressing and holding both volume buttons at the same time—a double beep indicates Quiet Call is off.
- Without use of a repeater: To hear a call, select a channel programmed to receive the caller's transmit frequency. To call another unit, select a channel programmed to transmit the other radio's receive frequency.
 - Using a repeater: A radio channel can hold two separate operating frequencies, one for receive and one for transmit. Your channel must work with the repeater's transmit and receive frequencies.
 - NOTE: A dealer must program the radio for repeater operation.
- An optional RM-7 Remote Speaker / Microphone and headset, plus the CCL-M 12 VDC Adapter, allow operation in a vehicle. See page 2 for accessories.
- To "talk" with each other, radios must be programmed identically for Quiet Call code, as well as frequency. Each code is unique; radios respond only to the code programmed.
 - Press and hold both volume buttons at the same time.
 - A single beep indicates Quiet Call squelch is on.
 - A double beep indicates Quiet Call squelch is off.

FCC LICENSING

Except for the five (5) MURS frequencies listed on page 13, the FCC requires the owners of radios operating on these frequencies to obtain a station license before using them.

The station licensee is responsible for ensuring that transmitter power, frequency and deviation are within the limits specified by the station license. The station licensee is also responsible for proper operation and maintenance of the radio equipment. This includes checking the transmitter frequency and deviation periodically, using appropriate methods.

To get an FCC license for VHF or UHF frequencies, submit FCC application Form 601. Your Ritron dealer can help you with this process.

HOW TO OBTAIN AN FCC RADIO LICENSE

Because your Ritron radio operates on Private Land Mobile frequencies, it is subject to the Rules and Regulations of the FCC, which requires all operators of these frequencies to obtain a station license before operating their equipment. Make application for your FCC license on FCC Forms 601, Schedules D and H, and Fee Remittance Form 159.

To have forms and instructions faxed to you by the FCC, call the FCC Fax-On-Demand system at **202-418-0177** from your fax machine; request Document numbers 3000159, 3060001, 3060003, and 3060006.

To have Document numbers 3000159, 3060001, 3060003, and 3060006 mailed to you, call the FCC Forms Hotline at **800-418-FORM (800-418-3676)**.

For help with questions concerning the license application, contact the FCC at **888-CALL-FCC (888-225-5322)** or log on at www.fcc.gov

You must decide which radio frequency(ies) you can operate on before filling out your application.

For help determining your frequencies, call Ritron at **800-USA-1-USA (800-872-1872)**.

INDUSTRY CANADA REGULATIONS

Industry Canada requires the owners of the radios to obtain a radio license before using them.

Application forms can be obtained from the nearest Industry Canada District office.

1. Fill in the items per the instructions. If you need additional space for any item, use the reverse side of the application.
2. Use a typewriter or print legibly.
3. Make a copy for your files.
4. Prepare a check or money order to "Receiver General for Canada", for the amount listed at <http://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf01027.html>. (Licenses are renewed annually on April 1st. Refer to the calculation for application fees for each month.)
5. Mail the completed application, along with your check or money order, to the closest Industry Canada District Office.

Notes: Fees are subject to change without notice.

SAFETY STANDARDS

The FCC (with its action in General Docket 79-144, March 13, 1985) has adopted a safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated equipment. Ritron observes these guidelines and recommends that you do also:

- DO NOT hold the radio so that the antenna is very close to or touching exposed parts of the body, especially the face or eyes, while transmitting. Keep the radio vertical, eight inches away while talking into the front panel.
- DO NOT press the Push-To-Talk except when you intend to transmit.
- DO NOT operate radio equipment near electrical blasting caps or in an explosive atmosphere.
- DO NOT allow children to play with any radio equipment that contains a transmitting device.
- Repair of Ritron products should be performed only by Ritron authorized personnel.

SERVICE

Federal law prohibits you from making any internal adjustments to the transmitter, and / or from changing transmit frequencies unless you are specifically designated by the licensee.

If your radio equipment fails to operate properly, or you wish to have the radio programmed, contact your local authorized dealer or Ritron.

U.S. Manufacturer:

RITRON, INC. - Repair Department

505 West Carmel Drive,

Carmel, Indiana 46032 USA

Phone: 317-846-1201

FAX: 317-846-4978

Email: customer_service@ritron.com

RITRON, INC. LIMITED WARRANTY**WHAT THIS WARRANTY COVERS:**

RITRON, INC. ("RITRON") provides the following warranty against defects in materials and/or workmanship in **RITRON Radios and Accessories** under normal use and service during the applicable warranty period (as stated below). "Accessories" means antennas, holsters, chargers, earphones, speaker/microphones and items contained in the programming and programming/service kits.

<u>WHAT IS COVERED</u>	<u>FOR HOW LONG</u>	<u>WHAT RITRON WILL DO</u>
Base Radio	1 year*	During the first year after date of purchase, RITRON will repair or replace the defective product, at RITRON's option, parts and labor included at no charge.
Accessories	90 days*	<i>*After date of purchase</i>

WHAT THIS WARRANTY DOES NOT COVER:

- Any technical information provided with the covered product or any other RITRON products;
- Installation, maintenance or service of the product, unless this is covered by a separate written agreement with RITRON;
- Any products not furnished by RITRON which are attached or used with the covered product, or defects or damage from the use of the covered product with equipment that is not covered (such as defects or damage from the charging or use of batteries other than with covered product);
- Defects or damage, including broken antennas, resulting from:
 - misuse, abuse, improper maintenance, alteration, modification, neglect, accident or act of God,
 - the use of covered products other than in normal and customary manner or,
 - improper testing or installation;
- Defects or damages from unauthorized disassembly, repair or modification, or where unauthorized disassembly, repair or modification prevents inspection and testing necessary to validate warranty claims;
- Defects or damages in which the serial number has been removed, altered or defaced.
- Batteries if any of the seals are not intact.

IMPORTANT: This warranty sets forth the full extent of RITRON's express responsibilities regarding the covered products, and is given in lieu of all other express warranties. What RITRON has agreed to do above is your sole and exclusive remedy. No person is authorized to make any other warranty to you on behalf of RITRON. Warranties implied by state law, such as implied warranties of merchantability and fitness for a particular purpose, are limited to the duration of this limited warranty as it applies to the covered product. Incidental and consequential damages are not recoverable under this warranty (this includes loss of use or time, inconvenience, business interruption, commercial loss, lost profits or savings). Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitation on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. Because each covered product system is unique, RITRON disclaims liability for range, coverage, or operation of the system as a whole under this warranty.

WHO IS COVERED BY THIS WARRANTY: This warranty is given only to the purchaser or lessee of covered products when acquired for use, not resale. This warranty is not assignable or transferable.

HOW TO GET WARRANTY SERVICE: To receive warranty service, you must deliver or send the defective product, delivery costs and insurance prepaid, within the applicable warranty period, to **RITRON, INC., 505 West Carmel Drive, Carmel, Indiana 46032, Attention: Warranty Department**. Please point out the nature of the defect in as much detail as you can. You must retain your sales or lease receipt (or other written evidence of the date of purchase) and deliver it along with the product. If RITRON chooses to repair or replace a defective product, RITRON may replace the product or any part or component with reconditioned product, parts or components. Replacements are covered for the balance of the original applicable warranty period. All replaced covered products, parts or components become RITRON's property.

RIGHTS TO SOFTWARE RETAINED : Title and all rights or licenses to patents, copyrights, trademarks and trade secrets in any RITRON software contained in covered products are and shall remain in RITRON. RITRON nevertheless grants you a limited non-exclusive, transferable right to use the RITRON software only in conjunction with covered products. No other license or right to the RITRON software is granted or permitted.

YOUR RIGHTS UNDER STATE LAW: This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

WHERE THIS WARRANTY IS VALID: This warranty is valid only within the United States, the District of Columbia and Puerto Rico.