AOR

Instruction Manual for Model AR2000

Wide Range Portable Monitor Receiver

Every effort has been made to make this manual correct and up to date. Due to continuous development of the receiver and by error or omissions anomalies may be found and this is acknowledged.

Most apparent faults are due to accidental miss-operation of the receiver, carefully read all of the manual before deciding to return the set for repair.

General

This AOR handheld wide band scanning receiver is renowned for it's high standards of performance and range of facilities which other manufacturers try to imitate.

Although offering a long list of facilities and operating modes, the receiver remains reasonably easy to operate. The display often provides 'prompts' for selected operations such as a flashing "CH" to invite you to key in a new memory channel number.

The receiver has an exceptionally wide frequency coverage from 500KHz to1300MHz (1.3GHz!!!). The modes available are AM, FM (narrow) and FM (wide). All available modes may be selected at any frequency within the receiver's coverage.

Although carefully designed, this receiver (like all receivers) suffers from a degree of internal noises known as spurii. They are a product of the receiver's circuitry and do not represent a fault.

All information such as frequency, mode, channel, etcetera is presented in an easy to see Liquid Crystal Display (LCD). For night time use there is a lamp with a timeout of about 6 seconds to prevent undue battery drain.

The aerial connection is of the standard BNC type allowing straight forward connection to almost any VHF / UHF aerial. There is also a 10dB attenuator on the top panel to increase versatility.

There is a massive EEPROM storage (no batteries required) of 1000 memories held as 10 banks of 100 also there are 10 additional programmable search banks. Each memory will store frequency and mode, the search bands will also store the increment. Memories and search bands may be 'locked out' for the days when you don't want to listen to something you have previously programmed.

In search mode, you may lock out upto 1000 continuously occupied frequencies (100 in each of the 10 search bands) so that the frequency is skipped when next scanned. Although the search bands are pre-programmed at the factory, they may be easily re-programmed from the keypad by the user.

Accessories supplied

DA900 single wide band whip aerial for VHF and UHF

AC charger

4 x AA high capacity rechargeable NiCad batteries

12V DC lead for mobile operation

Soft case with carry strap

Belt hook

Operating manual

Power and batteries

The receiver is powered from 4 x AA high capacity rechargeable NiCad batteries (supplied), they are already fitted inside the the the set. The NiCads can be recharged using the supplied AC charger or DC lead and may be used over and over again.

The NiCads are NOT factory charged and it is suggested they are put onto charge while you read this manual. A full charge will take about 15 hours with the receiver switched off. A set of fully charged NiCads should give a few hours of average use, this will depend on operation, settings such as volume will have a great effect. Please note, background noise may still be heard from the speaker even though the NiCad batteries are exhausted, usually the Liquid Crystal Display fails to operate in this condition.

The supplied AC charger is NOT designed to power the set while charging. The receiver should be switched off while charging the NiCads using the supplied charger.

Nicads are prone to 'memory effect', as a result they may have to be cycled (fully charged and used until flat) 3 or 4 times before they provide a satisfactory period of operation. Once charged, you should never leave the NiCads in a flat condition. Although you may charge the NiCads in order to 'top up' their capacity if you have only used the set for an hour or two, the NiCads should be cycled at least once per month to ensure continued long term reliability.

Note: Do not over-charge the NiCads, (15 hours is sufficient). In severe cases of over-charging high temperatures can be generated, this can result in damage to the NiCads and to the receiver. If this point is ignored, there is a small but potential danger of personal injury due to explosion. Never short circuit NiCad batteries, the effect is similar to over-charging but happens very quickly. Never try to charge normal dry batteries.

The internal NiCads are located in the battery compartment on the rear lower half of the receiver. They may be easily removed so that an additional set of NiCad or dry cells may be substituted when the first set become drained, this will enable extended operation when away from the house or car.

When connected to a nominal 13.8V DC power source (using the supplied lead in the car or at home) the receiver may be operated and the NiCads recharged at the same time. The supplied lead is wired CENTRE POSITIVE, make sure you observe the correct polarity.

Controls

The receiver is housed in an attractive, strong plastic cabinet. Controls for operation are located on the top and front faces of the cabinet.

1. Aerial connector. This is a standard BNC type. It's operation is like a bayonet (push and twist) and is mounted on the top face of the cabinet. The supplied portable aerial may be connected to this point or a mobile / base.

2. VOL & POWER (volume) control. This is the inner knob of the dual concentric rotary controls located on the top face of the cabinet. It is used to set the required audio output from the receiver. When turned fully clockwise the volume is at maximum, when rotated anti-clockwise the volume is reduced to a minimum. At the fully anti-clockwise position the power ON/OFF switch is activated.

3. SQL (squelch) control. This is the outer knob of the dual concentric rotary controls located on the top face of the cabinet. The control is used to eliminate unwanted background noise on unoccupied frequencies. It is also used by the receiver to decide when to stop during scan and search modes.

The squelch control needs careful setting to achieve optimum operating performance. Rotate the control clockwise until the background noise just disappears, this is the most sensitive setting of the control. In practice the control is usually rotated a little further clockwise to avoid stopping on noise or very weak and unreadable signals. If the control is rotated too far clockwise then weak signals will be totally lost and only strong signals will be heard.

4. ATT (attenuator) switch. The switch has two positions marked as LOCAL and DX. For most situations the DX or long distance position is used where the receiver is at its most sensitive.
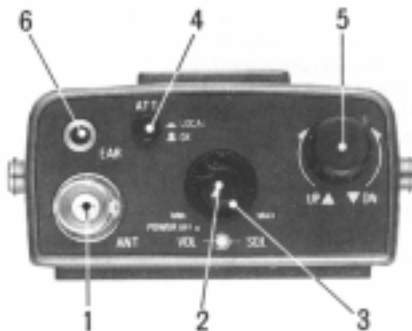
When operating the receiver in the presence of strong signals such as those from TV, broadcast, taxi, police etcetera, some interference may be experienced. This interference can take many forms such as an increase in background noise, desensitising of the receiver or mixing of many stations together. The cure for most of these effects is to use the attenuator switch in the LOCAL position. This reduces the level of signals reaching the receivers circuitry and helps the set cope with strong signals.

The addition of the attenuator switch to the receiver allows the set to be sensitive when required for weak signal listening and provide a reduction in overloading when necessary.

5. UP/DOWN (tuning) control. Located on the top face of the cabinet, this rotary control allows 'manual' tuning of frequencies displayed on the receiver. The control has a convenient click operation, the tuning increment can be programmed from the front panel keypad.

6. EAR (earphone or external speaker) socket. Located on the top face of the cabinet. This is a standard 3.5mm mono jack socket. Either an earphone or small external speaker may be connected, when in use the internal speaker is automatically disconnected. The impedance of an external device should be 8 OHMS or greater.

7. **CHG (charging) socket.** Located on the right hand side of the cabinet. The socket is of the dual concentric type and accepts a 1.3mm plug. The supplied AC charger or DC lead are connected to this point when charging the receiver's batteries or operating from an external supply. Any suitable DC supply of 11 to 15 volts may also be connected to this socket, please note the connection is CENTRE POSITIVE.

8. **DISPLAY.** Located on the front of the cabinet, it is a Liquid Crystal Display (LCD). Comprehensive information such as frequency, mode, channel etcetera is displayed in an easy to understand format. For night time use there is a lamp.

9. **KEYBOARD.** Located on the front of the cabinet underneath the Liquid Crystal Display. The keyboard is laid out in a logical manner and is split into numeric and command areas.

LIGHT For night time use this key activates the lamp. There is a timer of about 6 seconds which automatically switches off the lamp to reduce the drain on the batteries.
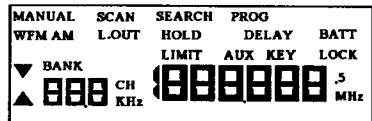
0 to 9 The keys 0 to 9 plus the decimal point (.) are used for entering frequency, step size, memory channel number, bank number and so on.

The same keys are used in the bank select mode, in which case the numbers 0 to 9 correspond to the programmed frequency and memory channels.

CLEAR (.) Press once to select a decimal point when entering frequency information. Press twice to clear an incorrect entry.

ENTER Used to ENTER a frequency after selection from the keypad. Also used to complete other programming operations such as memory changes.

SEARCH Used to start the programmed frequency search operation. It is also used to manually advance the search process when stopped on an unwanted frequency.

SCAN Used to start the memory bank scanning operation. It is also used to manually advance the scan process when stopped on an unwanted channel.

MANUAL Used to engage the manual mode of the receiver, in this mode the user can change parameters such as frequency, channel increment or directly select a memory channel. Each further press of the manual key will cause the receiver to advance one step through the scan bank.

When the receiver is first switched on, it is a good idea to press the manual key so that the receiver enters a 'known state' of operation.

PROG Used to set the bottom point while programming the search and scan modes.

LIMIT Used to set the high point while programming the search and scan modes. Also used in manual mode to select the AUX function (engaging priority channel operation).

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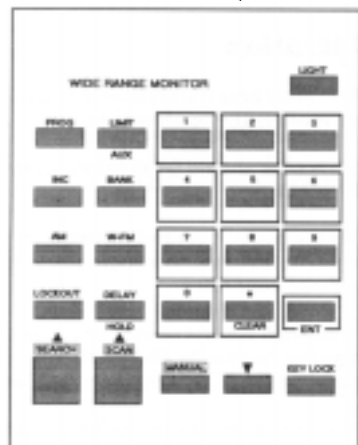
INC Used to enter the desired tuning increment (step) while in manual or search modes.

BANK Used to select the desired BANK while in scan or search mode.

AM/FM Selects either AM (amplitude modulation) or FM (frequency modulation). AM is generally used by aircraft both on VHF and UHF, FM is used by most other services.

W-FM Selects W-FM (wide band frequency modulation). Mainly used by VHF stereo broadcast stations.

LOCKOUT Press once to lock out a frequency or memory channel. Pressing a second time generally unlocks the frequency or memory channel. This key has multiple functions so be careful with its use.

Up to 100 frequencies in each of the 10 search banks can be locked out, a total of 1000 frequencies.

It is possible by miss-operation, to inadvertently lock out an entire search bank instead of a single frequency. Once a complete search bank is locked out it requires EVERY SINGLE FREQUENCY LOCKED OUT of the search bank to be unlocked before the bank can be searched again.

There are other ways to limit the banks omitted in search and scan mode.

DELAY Used in scan and search modes to select DELAY and HOLD. When HOLD is shown on the display, the scan or search stops on a busy channel and remains there even if the signal has gone. When DELAY is shown on the display, the scan or search stops and pauses on a busy channel for a couple of seconds before automatically moving off again.

▼ The DOWN key causes the scan or search to reverse from its usual ascending operation and move downwards. Holding the key for more than a second while the receiver is stopped in scan or search mode causes the receiver to continue operation but in a downward direction.

KEY LOCK This key disables all other keyboard functions. The facility is handy if the receiver is required to operate on a single channel and is located in a coat pocket. Accidental change of frequency or mode is prevented. Pressing the key a second time cancels the function.

Operation

After unpacking the receiver, the batteries should be charged or a fully charged set fitted. You may also connect the receiver to an external DC supply using the supplied DC lead.

The receiver should be switched on by rotating the volume control in a clockwise direction from the 'off' position.

With the squelch control turned fully anti-clockwise to allow sound from the speaker, the volume should be adjusted to a comfortable level. It is never a good idea to switch on the receiver with an earphone connected.

The squelch control should be rotated clockwise until the background noise is just cancelled. This is known as 'threshold' and is the most sensitive setting for the squelch control. If you find setting the squelch difficult, try removing the aerial from the receiver.

It is best to press the **MANUAL** key at this time to place the receiver in a known state of operation.

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Manual mode

1. To ENTER a FREQUENCY.

Key in the digits and use the decimal point after the MHz. You don't have to enter the following zeros' as they will be added automatically after pressing the decimal point and enter. In fact you can usually leave out the decimal point when entering a round MHz.

If you key in an 'out of range' frequency, a frequency error message is displayed 'Fr .Err'

MANUAL (frequency in MHz) ENTER

Example: **MANUAL - 131.000 - ENTER**

Or: **MANUAL - 131. - ENTER**

2. Tuning the receiver.

Turn the rotary control on the top face of the cabinet. Rotating the control clockwise advances the displayed frequency while anti-clockwise operation lowers the displayed frequency. The display will show an up or down arrow as appropriate.

3. To change the frequency INCREMENT (step).

This is used with the rotary tuning control, the default is 12.5 KHz. It is good to start at a round number such as 131.000

INC (tuning step in KHz) ENTER

Example: INC - 25 - **ENTER**

You can select an increment in multiples of 5 KHz and 12.5 KHz between the limits of 5 and 995 KHz.

4. To change MODE.

It is worth noting that when you change mode while a memory bank number is showing, the contents of that memory are often automatically updated. For this reason it is worth keeping one memory channel reserved as a 'note pad' and dialled in before you start manual operation. Perhaps memory channel 000 would be a good choice.

Press **AM / FM** to select AM or Narrow Band FM

Press **W-FM** to select Wide Band FM

There is no need to press enter but there is no negative effect should you do so.

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Memory mode

The receiver has 1000 memory channels arranged in 10 banks of 100 memories. The banks are numbered 0 to 9.

1. It is possible to ENTER both frequency and mode into MEMORY.

(Memory BANKS start at 0 and continue through 1, 2, to 9. Memory CHANNELS start at 00 and continue through 01, 02, to 99).

MANUAL PROG (memory bank and channel) ENTER

Example: To enter the displayed frequency into MEMORY BANK 1, CHANNEL 52.

MANUAL - PROG - 52 - ENTER

Again, there is no need to press enter but there is no negative effect should you do so.

2. To enter a new frequency and mode into memory.

MANUAL (frequency in MHz) ENTER (mode) PROG (memory bank and channel number)

Example: To enter 145.600 MHz, FM mode into MEMORY BANK 0 and CHANNEL 55.

MANUAL - 145.6 - ENTER - FM - PROG - 055

N.B. Remember the displayed frequency can sometimes be automatically written into the current memory channel when the mode is changed. Make sure you don't accidentally over write a wanted memory channel in this manner.

3. To RECALL the contents of a previously stored memory channel.

It is worth noting that frequencies are often already stored in the receivers memory bank when you unpack it, this is part of the testing conducted during manufacturer and preparation for sale.

MANUAL BANK (bank and channel number)

Example: To recall the contents of memory BANK 1, CHANNEL 52.
(Remember, you must have something stored first).

MANUAL - BANK - 152

4. To CLEAR the contents of a previously stored memory channel.

MANUAL CLEAR ENTER PROG (memory bank and channel)

Example: To clear the memory contents of BANK 1, CHANNEL 20

MANUAL - CLEAR - ENTER - PROG - 120

5. Memory LOCKOUT.

You can lockout a memory channel while in manual mode by first selecting the memory channel then press LOCKOUT. Lockout is confirmed by a flashing 'L.OUT' on the display.

Later on (while in SCAN mode) you may no longer wish to listen to to a specific memory channel.

Press the LOCKOUT key to skip over the channel.

To reinstate the channel at a later date, unlock the channel in MANUAL mode by keying in the channel location and pressing LOCKOUT again. Lockout status is confirmed by a flashing 'L.OUT' on the display.

6. Auxiliary (PRIORITY) Channel.

Any of the 1000 memory channels previously programmed may be used as the auxiliary (AUX). When activated, the receiver will 'pop over' to the priority channel to check for activity regardless of the current displayed frequency or mode. The facility can be useful for keeping an eye on a distress frequency while scanning another frequency band.

To select the desired memory location

MANUAL AUX PROG (memory bank and channel) ENTER

Example: Assume you wish to select memory bank 1 channel 25 as the auxiliary

MANUAL - AUX - PROG - 125 - ENTER

To activate the AUX function

Press **MANUAL - AUX**

The 'AUX' indicator appears on the front panel to confirm status.
To de-activate the AUX function repeat the process

Press **MANUAL - AUX**

Under some circumstances there may be a 'click' heard from the internal speaker while the priority function is in use. This is normal and a product of the facility, it is NOT a fault.

Scan mode

Manually changing frequency is a slow process. In order to 'catch' brief bursts of communications such as from control towers to aircraft requires a faster method of frequency change.

For this reason and to increase pleasure of operation the memories may be automatically scanned under control of the receiver's microprocessor. The receiver is capable of scanning many memory channels per second.

It is usually convenient to 'group' all similar frequencies together to enable their selection independently from other programmed channels. For example you could store ALL VHF airband frequencies in memory bank 1 instead of randomly throughout the 1000 memories.

1. To SCAN all memories.

(Not what you would normally do, you would normally want to listen to a specific type of activity. It is however a good starting point).

Press **SCAN**

The receiver starts scanning all programmed memory channels, it will not try to scan un-occupied channels. It could potentially take a long time to complete its full scan if you have programmed all the 1000 memory channels, even though the receivers scan process is very rapid.

You need to set the squelch to cancel the background noise before the set is free to scan. The receiver finds it difficult to differentiate between weak signals and background noise so careful and continuous re-adjustment of the squelch control may be necessary.

Problems with scanning

If for some reason your receiver refuses to scan the bank you want an instead jumps to another bank, you have probably accidentally used PROGRAM BANK SCAN. To clear the apparent problem key in the following:

SCAN - BANK - PROG - 0 - LIMIT - 9 - ENTER

2. Program BANK SCAN.

When you grow tired of scanning all memory channels you can specify the start point.
SCAN BANK (bank number)

Example: To start scanning at memory BANK 5

SCAN - BANK - 5

The receiver will start at bank 5 but will then move onto bank 6 then bank 7 etcetera until all 1000 channels have been scanned and the receiver starts back on bank 5 again.

To PROGRAM a specific SCAN BANK.

SCAN BANK PROG (start bank number) LIMIT (end bank number) ENTER

Example: To SCAN between BANK 1 and BANK 5

SCAN - BANK - PROG - 1 - LIMIT - 5 - ENTER

In the same way you can program the receiver to scan only one bank, maybe BANK 1 where you may have programmed VHF airband frequencies.

Example: **SCAN - BANK - PROG - 1 - LIMIT - 1 - ENTER**

This effectively has excluded banks 0, 2, 3, to 9 without actually locking them out and is the preferred method of programmed bank scan.

3. Memory LOCKOUT.

If during scan the receiver stops on a memory channel that you no longer wish to listen to, you may press the LOCKOUT key to skip over the channel. Lockout is confirmed by a flashing 'L.OUT' on the display.

To reinstate the channel at a later date you may unlock the channel in MANUAL mode by keying in the channel location and pressing LOCKOUT again. The operation is confirmed by the removal of the flashing 'L.OUT' from the display.

4. Memory group lockout.

Choose the lowest channel number of the group you wish to lock out.
For example, to lock out the group between 500 and 510

MANUAL - BANK - 500 - LOCKOUT
MANUAL (the receiver now advances to the next memory) - **LOCKOUT**
MANUAL - LOCKOUT
MANUAL - LOCKOUT etcetera

This is a short cut version of normal memory lockout, a flashing 'L.OUT' sign appears on the display to confirm each channel status.

5. Memory bank lockout (ALL 100 memories).

You can lock out a whole group at once.

MANUAL BANK (bank and channel number) BANK LOCKOUT

The bank/channel number can be any location in the desired bank. (In other words, to lock out the whole of BANK 5, you could select any location between 500 and 599).

Example: **MANUAL - BANK - 512 - BANK - LOCKOUT**

To release memory bank lockout a similar process is carried out.

MANUAL BANK (lowest bank/channel number) LOCKOUT

Example: **MANUAL - BANK - 500 - LOCKOUT**

The flashing 'L.OUT' disappears from the display to confirm operation. Any channel which was individually locked out remains locked out and unaffected by the previous operation.

Turning the rotary tuning control during scan causes the process to be cancelled. The receiver remains in memory select mode so that you can manually step through the memory channels using the rotary control. This is a very convenient feature.

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Search mode

The receiver has the ability to search between ten sets of user definable frequency limits known as SEARCH BANKS.

For your convenience these have been pre-programmed during manufacture to suite your local market requirements. The search banks may be reprogrammed by you at any time from the keypad.

If you choose, the programming of these search banks need not have any relationship to any front panel legend, this ensures maximum flexibility of operation.

In search mode, you may define the lower and upper frequency limits, mode of operation and increment (step size) between 5 KHz and 995 KHz in multiples of 5 KHz or 12.5 KHz.

1. To SEARCH all banks.

(Again you wouldn't normally want to listen everything at once. It is however a good starting point).

Press **SEARCH**

The receiver starts searching all programmed search banks. It could potentially take a long time to complete its full search process of all banks, even though the receiver's search process is very rapid.

You need to carefully set the squelch to cancel the background noise before the set is free to search. The receiver finds it difficult to differentiate between weak signals and background noise so careful and continuous re-adjustment of the squelch control may be necessary.

Rotation of the UP/DOWN tuning control during search cancels the operation. The receiver remains in the current search bank and you may manually tune through the band using the rotary control.

Problems with searching.

If for some reason your receiver refuses to search the bank you want and instead jumps to another bank you have probably accidentally used PROGRAM SEARCH BANK. To clear the apparent problem key in the following:

SEARCH - BANK - PROG - 0 - LIMIT - 9 - ENTER

If you still have problems, look at the sections on releasing search bank lockout and search frequency lockout.

2. Program SEARCH BANK.

When you grow tired of searching through all programmed banks, you can specify the start point.

SEARCH BANK (bank number)

Example: To start searching at SEARCH BANK 5

SEARCH - BANK - 5

The receiver will start at search bank 5 but will then move onto bank 6 then bank 7 etcetera until all banks have been searched and the receiver starts back on bank 5 again.

To PROGRAM a specific SEARCH BANK.

SEARCH BANK PROG (start bank number) LIMIT (end bank number) ENTER

Example: To SEARCH between BANK 1 and BANK 5

SEARCH - BANK - PROG - 1 - LIMIT - 5 - ENTER

In the same way you can program the receiver to search only one bank, maybe BANK 1 where you may have programmed the limits for the VHF airband.

Example: **SEARCH - BANK - PROG - 1 - LIMIT - 1 - ENTER**

This effectively has excluded banks 0, 2, 3, to 9 without actually locking them out and is the preferred method of programmed bank scan.

3. Search frequency lockout.

If during search the receiver stops on a frequency that you no longer wish to listen to, you may press the LOCKOUT key to skip over the frequency. It will be skipped over on the next search.

Up to 100 frequencies may be locked out of each search bank. Be careful not to get carried away and lock out ALL of the frequencies in the bank, if you do then the search facility will not function.

4. Search bank lockout.

SEARCH BANK (bank number) BANK LOCKOUT

Example: To lockout search bank 4

SEARCH - BANK - 4 - BANK - LOCKOUT

To release search bank lockout a similar process is carried out.

SEARCH BANK (bank number) LOCKOUT

Example: To release search bank 4

SEARCH - BANK - 4 - LOCKOUT

NOTE: To cancel this operation requires ALL locked out frequencies to be released, for this reason it is suggested that you use program search bank where possible as an alternative.

5. Releasing search bank lockout (or individually locked out frequencies).

To release a locked out search bank, you first need to unlock ALL locked out frequencies in the search banks. To make this process easier, it is possible to scroll through the locked out frequencies.

To scroll through the locked out frequencies

SEARCH - BANK - PROG - LOCKOUT

The first of the locked out frequencies will appear on the display. The 'L.OUT' indicator will also be flashing on the display to show status.

You must release the locked out frequencies one at a time

Press **LOCKOUT**

The display will clear and step to the next locked out frequency. Repeat this process until the 'L.OUT' indicator is steady on the display and the BANK indicator is flashing.

Press **LOCKOUT**

The 'L.OUT' indicator will disappear and the receiver will start searching.

6. Reprogramming search bank limits.

Before you change and pre-programmed limits, it may be a good idea to note the existing band data so that the receiver may be re-programmed to its initial state at a later date. In fact you may be happy with the pre-programming of the search banks, in which case you will not need to carry out this process.

Assume that you want to reprogramme SEARCH BANK 2 to cover a specific part of the 70cm Amateur Radio band. The desired parameters are:

432.000 - 433.500 MHz, 25 KHz steps and FM.

SEARCH PROG (start frequency) LIMIT (stop frequency) ENTER (search step in KHz) ENTER (mode) ENTER (bank number) ENTER SEARCH

Example: **SEARCH - PROG - 432.000 - LIMIT - 433.500 - ENTER - 25 - ENTER - FM - ENTER - 2 - ENTER - SEARCH**

The previously stored information will be over-written.

7. Storing search frequencies into memory.

When searching you may find an interesting frequency and want to return to it later.

Press **DELAY/HOLD** so that the 'HOLD' indicator appears on the display

Press **ENTER**

Select memory bank and channel

Example: The receiver stops on 145.600 MHz and you wish to save the frequency and mode, perhaps we wish to store the information in Memory bank 1, channel 23

Press **DELAY/HOLD - ENTER - 123**

This concludes the operating section of the manual.

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Specification

Frequency range	500KHz to 1300MHz
Frequency steps	5KHz to 995KHz in 5 or 12.5 KHz steps
Sensitivity	FM approx 0.5uV or better across most of the range AM approx 3uV or better across most of the range
Receiving modes	AM, FM (narrow) and FM (wide)
Memory channels	1000 arranged in 10 banks of 100
Memory scan speed	Approx 20 channels per second
Scan delay time	Approx 2 seconds
Search banks	10 pre-programmed by may be reprogrammed by the user
Search speed	Approx 40 steps per second
Priority channel (AUX)	Any of the 1000 memories may be used as the priority Sampling time is approx every 2 seconds
Audio output	> 100mW at 10% distortion
Power supply	4.8V DC from 4x AA internal NiCad batteries (supplied), or 11-15V DC from external power source
Power consumption	Approx 80mA standby, 85-100mA with full audio output
Aerial input	50 OHM BNC connector
Size	170 x 35 x 65mm
Weight	300g (excluding batteries)
Instruction Manual version 1.02	Specifications are subject to change without notice due to continuous development of the receiver

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