1 Introduction

Thank you for purchasing the AR7000 wide band all mode receiver. The AR7000 is designed using DSP (Digital Signal Processing) technology to ensure the highest levels of performance and reliability. To get the best possible results from your AR7000 we recommended that you read this manual and familiarise yourself with the receiver. Although carefully designed, this receiver (like all receivers) suffers from a degree of internal noises known as spurii which are a product of the receiver's circuitry and do not represent a fault. Apparent faults may be due to accidental mis-operation of the receiver, if you think there is a problem, carefully read all of the manual before deciding to return the receiver for repair.

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 omission anomalies may be found and this is acknowledged.

2 Standard supplied accessories

- 1 x Power supply (a.c. to d.c., input voltage dependant on market)
- 1 x Infrared remote controller
- 1 x Operating manual (this booklet)

3 For your safety

There are no internal operator adjustments. In the unlikely event of servicing being required, please contact your dealer for technical assistance.

The AR7000 is designed for operation from its supplied a.c.-to-d.c. adapter. Operation is possible from a d.c. supply of 12 to 14V, which should be able to supply up to 2.0A. **Never connect the AR7000 directly to the a.c. supply.**

Do not use or leave the receiver in direct sunlight (especially the LCD). It is best to avoid locations where excessive heat, humidity, dust and vibration are expected. Always treat the receiver with care. Take care to avoid spillage or leakage of liquids into the receiver and a.c. power supply. Special care should be taken to avoid liquid entering around the controls, through the speaker grille or via the connection jacks.

If fitting a separate external earth rod, consider the implications carefully if your buildings' a.c. supply uses a Protective Multiple Earth (PME) system. If in doubt consult an expert electrician. Never earth to a gas pipe!

The AR7000 has a single BNC aerial socket for all frequencies. This socket is intended for connection of a 50 OHM (unbalanced) coaxial fed aerial such as a discone, dipole, unipole, yagi etc. When sighting the aerial, avoid power cables. A telescopic whip may be connected to this socket for local monitoring.

4 Index

5 Major features

- ✶ DSP at 10.7MHz IF stage
- ✶ Built-in colour LCD
- ✶ 2-VFO plus 1500 memory channels with text
- ✶ On screen menu driven operation
- ✶ Audio/Video output and IR remote controller
- ✶ RS232C control
- ✶ World clock, one main clock plus four programmable clocks
- ✶ Timer with five independent program on & off events

6 Care and maintenance

Look after your AR7000 and you should enjoy many years of monitoring. There are no internal operator adjustments. In the unlikely event of servicing being required, please contact your dealer for technical assistance.

6.1 Power supply

The AR7000 is designed for operation from its supplied a.c.-to-d.c. adapter. Operation is possible from a d.c. supply of 12 to 14V, which should be able to supply up to 2.0A

The d.c. input socket uses a mini coaxial power connector which is configured CENTRE POSITIVE, the chassis of the receiver is at negative ground. The power supply provided is pre-wired and provides a regulated nominal 12V d.c. output with suitable connectors being fitted as standard for the a.c. power input and connection to the AR7000 (for each world market area).

Although the AR7000 has no special rear panel socket for a connection of an RF earth, a separate earth may be connected to the chassis ground connectors (RS232, video, audio, BNC) then on to a water pipe, central heating system radiator or external earth rod. If fitting a separate external earth rod, consider the implications carefully if your a.c. building supply uses a Protective Multiple Earth (PME) system. If in doubt consult an expert electrician. Never earth to a gas pipe!

SAFETY NOTICE - Always disconnect the power supply from the a.c. socket when not in use.

6.2 Installation

Do not use or leave the receiver in direct sunlight (especially the LCD). Always disconnect and earth any external aerial system if an electrical storm is expected. Avoid a rapid disconnection then reconnection of the power supply. If disconnected, leave at least five seconds before reconnecting again. Ensure that all power connections are secure. Avoid strong RF fields from nearby transmitters. If in doubt, disconnect the AR7000 from the aerial and switch the set off.

6.3 Colour LCD

Always take care of the LCD screen which is fragile. Avoid knocking, banging or scratching the LCD, do not expose to direct sunlight or high temperatures.

6.4 Cleaning

Always keep the receiver free from dust and water. Use a soft, dry cloth to gently wipe the AR7000 clean. Never use abrasive cleaners or organic solvents which may damage certain parts.

7 Controls and Function

7.1 Front Panel

{figure 1}

7.1.1 Power Switch

Press this switch to power the radio on/off. In addition the separate infrared remote controller (supplied) will enable the AR7000 to be switched off. Note: The AR7000 may be switched off and on via the *infrared remote* **only if the AR7000 mechanical front panel switch remains depressed**.

7.1.2 Headphone Socket

A 3.5mm headphone jack plug can be connected for personal monitoring. When connected, the built-in speaker will be disconnected (audio automatically cut off).

7.1.3 LCD Display

A built-in 3.1" DSTN type NTSC colour LCD (Liquid Crystal Display) shows operating conditions.

7.1.4 Keypad

Press the keys to enter necessary data/information into the receiver. Some particular keys are assigned with dual functions, press and hold for more than one second to access the dual function. Only valid key(s) will be accepted.

Primary function "PUSH" - orange lettering, *quick tap* only required.

Secondary function "PRESS" (and HOLD) - white lettering, *hold for more than one second*.

Many functions are also available from the infrared controller.

7.1.5 Main Dial

Rotate the main dial to select the receive frequency. This dial is also used to select various receiver parameters via menus.

7.1.6 Infrared receive window

Point the infrared hand controller at this front panel window when the receiver is operated via the infrared hand controller.

7.2 Rear Panel

{figure 2}

7.2.1 AUX connector

This 8-pin 270º DIN socket provides output for audio, squelch switching, etc. Refer to section 10 of this manual for pin-out details.

7.2.2 Video output switch

This slide switch selects the video format of either PAL or NTSC. The default position is NTSC. **Note:** When PAL is selected the built-in LCD is disabled.

7.2.3 Video output terminal

This PHONO socket provides a composite video output to the external monitor in either NTSC or PAL depending upon selection.

7.2.4 Audio output

This PHONO socket provides audio output to external equipment (such as a camcorder etc). The output level is constant irrespective of the volume control setting.

7.2.5 Aerial (antenna) terminal

A BNC type connector is provided for aerial connection. A 50 OHM impedance aerial is recommended for this receiver. If wire aerial is connected any suitable Balun may be used for optimum results.

7.2.6 RS232C Connector

A D-SUB 9-pin connector is provided for straight lead connection with most types of PC via an RS232C connection. Refer to section 9 of this manual for connection information.

7.2.7 DC socket

Connect the supplied a.c.-d.c. adapter to this socket. The applicable standard for the jack/plug is RC5320A(EIAJ)/IEC13010. This plug/socket is wired centre positive, if using a different power supply, select a unit which is regulated producing 12 to 14V d.c. with a current capacity of at least 2.0A.

7.2.8 External speaker socket

This 3.5mm jack socket is provided for connection to an external speaker (8 OHMS). Audio level is variable via the volume control. When an external speaker is used, the built-in speaker will be disabled.

8 Before the set is switched on

8.1 Power supply

Ensure the power switch is in OFF position (switch protruding). Connect the d.c. plug of the standard power supply to the power input socket which is found on the rear panel of the AR7000.

8.2 Video format switch

Ensure that rear panel NTSC is selected to enable internal LCD operation.

8.3 Aerial connection

Connect a suitably terminated BNC aerial to the BNC aerial socket on the rear panel of the AR7000.

8.4 Power it up

Make sure that all necessary connections are made, and double check that the power supply voltage/polarity are correct. Press the front panel power switch to switch the AR7000 on. The dial mode set-up will be displayed on the LCD following the CPU initialising.

9 Keyboard (basic operation)

The AR7000 is designed to be operated using the main dial and keyboard. Explanation for usage of each key and the main dial follows:

{figure 3}

VOL. UP [↑] Increase the volume level, move the cursor upward.

VOL DOWN [↓] Reduce the volume level, move the cursor downward.

[←] Acts as a back space and is used to move the cursor. It also has the same action as rotating the main dial anti-clockwise in many menus.

[→] Move the cursor. It also has the same action as rotating the main dial clockwise in many menus.

[ESC] Terminate the on-going key sequence returning to the previously selected menu.

Main dial is used to tune through the receive frequency. Also used to select receive mode, squelch level, IF BW and AGC.

[ENT] Determine the selection of data/functions (used to finalise selection).

[STEP 1] PUSH (tap) with a finger (only momentarily) to enter the numeric data which is printed directly on the key in orange (primary function). PRESS (longer than one second) to select the function which is printed above the key in white.

Operating the AR7000 is simple if you follow the basic principles:-

1. Press (and hold for more than one second) the key of your intended function such as [STEP] and [MODE].

2. Select your desired value or data using the main dial or [←] [→] arrow keys.

3. Press [ENT] key to confirm the entry.

Understanding the basic operation

✶ Basic operating modes

The AR7000 is equipped with the 2 dial modes (VFO-A, VFO-B) and one memory mode. Push the [→] key to scroll from VFO-A to VFO-B to Memory back to VFO-A... in sequence. Push the [←] key to scroll VFO-A to Memory to VFO-B to VFO-A...in sequence.

{figure 4} Shows Dial mode VFO-A
{figure 5} Shows Dial mode VFO-B
{figure 6} Shows Memory mode

✶ Audio volume

Push the [↑] key to increase the audio volume. Push the [↓] key to decrease the audio volume. The audio volume level is indicated on the LCD as a graphical triangle bar meter in the upper right of the LCD.

{figure 7}

✶ K.Lock key lock

Press the [K.Lock] key to disable all other keys until [K.Lock] is pressed again. This is useful to prevent accidental movement of receive frequency while monitoring an important transmission or receiving data such as NAVTEX.

{figure 8}

✶ Squelch control

Press the [SQL] key. The SQ legend on the LCD will reverse to negative image. Push the [SQL] key again to toggle “OPN” (open) and “S0 ~ S9, +10, +20 ~ +60” (close). When a range between S0 & +60 is displayed, rotate the main dial to change the squelch threshold value. If you want the squelch open press the [ENT] key while the “OPN” legend is displayed.

In order to obtain an optimum squelch threshold level, press the [SQL] key, the “SQ” legend on the LCD will reverse to a negative image. Press the [SQL] key to initially select “S0”. Either rotate the main dial or [←] [→] keys to vary the squelch between S0 and S9, & +10 & +60 until the background noise (in the absence of a signal) is quieted, if a transmission is in progress, it may not be possible to close the squelch. Press the [ENT] key when you have selected an optimum squelch threshold.

{figure 9}

The squelch threshold level is displayed as a blue horizontal bar meter at the bottom of the signal meter (S-meter bar graph). It is important that the squelch level is not set too high or weaker signals will not be audible (as the squelch will remain closed). **NOTE:** The scan/search process will not begin when the received signal is below squelch threshold.

{figure 10}

A Dial mode

The AR7000 is equipped with the 2 dial modes, VFO-A and VFO-B. You can manually select/enter the receive frequency, receive mode, etc.

VFO is a historical term for Variable Frequency Oscillator, today it is used to describe a facility which stores frequency & mode which may be tuned.

Manual frequency entry

Example 1 Enter the frequency of 209.75MHz in VFO-A.

1. Push either the [←] or [→] key to access VFO-A (upper of the two large frequency readouts).

2. Press the [MODE] key for more than one second. Rotate the main dial or push the [←] or [→] keys to obtain the LCD legend “AUT” (automode, where the AR7000 automatically selects the appropriate receive mode, channel step and IF bandwidth for the displayed frequency) followed by [ENT].

{figure 11}

3. Push [2] [0] [9] [.] [7] [5] [ENT]

{figure 12}

Example 2 Enter 954kHz, still using VFO-A.

Push [0] [.] [9] [5] [4] [ENT]

From there rotate the main dial to tune around the medium wave band radio stations.

{figure 13}

B Memory mode

The AR7000 is equipped with a total of 1500 memory channels (100 ch x 15 banks). Each memory channel can be given an alpha-numeric ident of up to 7 letters for ease of identification, the ident is displayed to the upper left of the frequency (under the legend “MEMORY”). Memory channels are useful stores for regularly monitored frequencies to save laborious key strokes and repetitiveness, they are also used for fast reviewing of channels when automatically hunting for active transmissions - “SCANNING”.

To quickly transfer data from dial mode to memory, press the [FREQ] key while in the VFO mode, do not hold the key… just a quick tap will do! The current (top) frequency on the LCD will change colour to red. Press the [ENT] key to transfer the receive data (frequency, receive mode, AGC, ATT, SQ setting) to the next available memory channel of the present bank. Refer to section 2.6 of this manual.

Memory data may be entered into each channel & bank using the EDIT facility then swapped around and rearranged. Various frequencies are entered into the AR7000 memory channels during manufacture & test. See section 3.5 of this manual for information on memory edit.

Recall the memory channel

1. Push the [←] or [→] key to obtain MEMORY mode on the screen (upper of the two large frequency readouts).

{figure 14}

2. Rotate the main dial to step through the memory channels. Any memory channels which do not have valid data will not be shown. The channel and bank number is displayed at the top right of frequency readout in the format 00 to 99 for channel number followed by 00 to 14 for the bank number. For example, “21/03” represents channel 21, bank 03… you may refer to it as 2103 for ease of expression (ch/bk).

3. Press [BANK] (the bank LCD legend will reverse) and rotate the main dial to step through the memory banks. Push [ENT] when the desired memory bank is selected.

{figure 15}

C Search mode

In the search mode, the receiver will step through the frequency spectrum at the specified step size looking for active signals. The AR7000's LCD display will

graphically show such radio activities while the search is in progress (rather like an aeroplane vapour trail). It is possible to tune the radio by tracing a cursor onto the frequency you want to monitor (using the main dial). There are two types of search, **Manual** search and **Program** search.

C-1 Manual search

When the AR7000 is in the “DIAL” mode (either VFO-A or VFO-B on the upper line of the large frequency readout) the manual search can be used.

1. Push the [RUN/BRK] key while in dial mode to initiate the manual search. “M.SEARCH” is shown along with “Run” on the LCD while the search is in progress.

{figure 16}

Resultant spectrum analysis will be shown as the search progresses. When a signal above the squelch threshold is received, the search will stop at that point until such signal has disappeared and squelch closes.

2. You can force the manual search to resume by rotating the main dial (whichever direction you desire, up or down).

3. Press the [RUN/BRK] key to stop the search, the legend “Brk” confirms break (pause) on the LCD.

{figure17}

While the search is stopped in this situation, you can tune to other frequencies within the display window by rotating the main dial, a cursor follows the frequency spectrum on the screen. Active signals will be audible, the squelch may be adjusted as required.

4. Press the [ENT] key in the manual search mode if you wish to return to the dial mode still retaining the present frequency.

Press the [ESC] key in the manual search mode if you wish to return to the dial mode but with the frequency you were originally receiving before you switched to the manual search mode.

C-2 Program search

In the program search mode, the AR7000 will step through the pre-programmed frequency spectrum in the specified increment size. The AR7000 is equipped with 8 program search banks, number 0 to 7.

1. Press the [SEARCH] key while in the dial mode or memory mode, the program search menu will then be displayed on the LCD.

{figure 18}

2. Rotate the main dial to select the desired program search bank number 0 to 7.

3. Push the [RUN/BRK] key to start the program search process, the LCD displays the legends “P.SEARCH” (in light blue) and “Run” (in red) to confirm selection.

{figure 19}

Remember, the squelch must be advanced high enough to cancel the background noise or the search process will not progress as the AR7000 will *think* that it has found a busy frequency. Press [SQL] and rotate the main dial clockwise until background noise in cancelled then press [ENT] to accept the new value.

Resultant frequency spectrum analysis will be displayed on the lower section of the LCD (in green) as the search process advances. Strong signals appear as high vertical bars and weak or no signal as low bars. When a signal above the squelch threshold is received, the search process will stop on the active frequency and you will hear the transmission (if the volume is high enough) until the busy signal has disappeared (or in case of time controlled search is selected, after the specified time has elapsed). Rotate the main dial to force the search onward.

When the search reaches the top frequency limit, the search jumps back to the lowest frequency limit then advances forward again (depending on setting of forward, reverse, loop or link in the configuration menu).

4. Push the [RUN/BRK] key while the program search is in progress to stop the search. The legend “Brk” will be will be displayed in place of “Run” on the LCD.

{figure 20}

You may manually tune around by rotating the main dial, a cursor (vertical dark band through the spectrum display) follows your movement through the limits of the display window.

5. Push the [ENT] or [ESC] key to return to the program search menu to make changes or to select a different search bank.

6. Push the [ESC] key to return to the operating mode before the program search process began.

D Scan mode

D-1 Manual scan

1. While in the memory mode (press the [←] or [→] key until “MEMORY” is displayed) press the [BANK] key. The bank number legend will reverse contrast on the LCD. Rotate the main dial to select the desired bank number, there are 15 scan banks numbered 0 to 14, accept the selection by pressing [ENT].

{figure 21}

2. Push the [RUN/BRK] key, the legend “M.SCAN” will appear on the LCD to confirm selection and the scan process will start.

{figure 22}

Remember, the squelch must be advanced high enough to cancel the background noise or the scan process will not progress as the AR7000 will *think* that it has found a busy channel. Press [SQL] and rotate the main dial clockwise until background noise in cancelled then press [ENT] to accept the new value.

Resultant frequency spectrum analysis (representing channel activity) will be displayed on the lower section of the LCD (in green) as the scan process advances. Strong signals appear as high vertical bars and weak or no signal as low bars. When a signal above the squelch threshold is received, the scan process will stop on the active channel and you will hear the transmission (if the volume is high enough) until the busy signal has disappeared. Rotate the main dial to force the scan to resume in whichever direction you choose.

3. While the scan is stopped, rotate the main dial to force the scan resume. When the scan reaches the top channel number, it reverses back progressing toward the lowest channel number, then advances forward again.

4. Push the [RUN/BRK] key while scanning. The scan will stop and the legend “Brk” will be displayed on the LCD. Rotate the main dial to step through the memory channels, a cursor (vertical dark band through the spectrum display) follows your movement through the limits of the display window.

{figure 23}

5. Push the [ENT] key while scanning. The receiver will return to the memory mode retaining the present frequency. Push the [ESC] key to go back to the memory channel used prior to the selection of manual scan mode.

D-2 Program scan

1. Press the [SCAN] key while in dial mode or memory mode. The program scan menu will appear on the LCD.

{figure 24}

2. Rotate the main dial to select your desired program scan group number. There are eight program scan groups 0 to 7. These are not the same as the 15 memory banks, but are special program scan groups where start / stop memory banks & channels may be nominated along with direction of scan, time controlled scan value etc. Any number of adjacent memory channels and banks may be nominated for start / stop limits for each of the eight program scan groups.

3. Push the [RUN/BRK] key, the legend “P.SCAN” will be displayed along with the legend “Run”. The program scan process will commence for the chosen memory group (providing memory channels contain data).

The scan will stop when the active signal above squelch threshold is received. The scan resumes either when such signal has disappeared, or in case of time controlled scan, when the pre-determined time has elapsed. Rotate the main dial to force the scan to resume.

{figure 25}

4. Push the [RUN/BRK] key while scanning to pause the scan process. The scan will stop and the legend “Brk” will be displayed on the LCD. Rotate the main dial to step through the memory channels, a cursor (vertical dark band through the spectrum display) follows your movement through the limits of the display window.

{figure 26}

5. Push the [ENT] or [ESC] key to return to the program scan menu to make changes or to select a different scan group.

6. Push the [ESC] key to go back to the operating mode in use prior to program scan selection.

AR7000 Reference manual

1. Basic operation

1.1 Selection of the basic operating mode

Push the [→] key to advance the operating mode clockwise, VFO-A to VFO-B to MEMORY to VFO-A..., push the [←] key to select anti-clockwise.

{figure 27}

{figure 28}

{figure 29}

1.2 Audio volume

Push the [↑] key to increase the audio volume, push the [↓] key to decrease (lower) the audio volume level.

{figure 30}

1.3 Key lock

Push the [K.Lock] key to lock the keypad of the radio, this is useful to prevent accidental frequency change, the LCD legend “Lock” confirms operation. Push the [K.Lock] key again to disengage the lock as a toggle.

{figure 31}

1.4 Squelch control

To set the squelch permanently open

Press the [SQL] key so that the “OPN” legend appears on the LCD followed by [ENT].

{figure 32}

To adjust the squelch threshold level

Press the [SQL] key to toggle “OPN” and “S-meter value”. While S-meter value is indicated, rotate the main dial or push the [→] or [←] keys to vary the squelch S-meter value.

Push the [ENT] key when you have selected the desired value.

{figure 33}

The squelch value is indicated as a blue line displayed underneath the S-meter.

Note: The scan/search will only begin when the background signal (noise) is below squelch threshold.

1.5 AGC setting

The AR7000 is provided with AGC (Automatic Gain Control) positions, “FAST” and “SLOW”. Each press of the [AGC] key toggles between the FAST and SLOW positions. A fast setting is usually best for CW operation when receiving Morse code and other data modes, at all other times SLOW is usually the best choice.

{figure 34}

1.6 ATT (Attenuator) setting

The AR7000 is equipped with a 10dB RF attenuator, this can be useful for reducing the effect of strong local signals which otherwise may lead to “mixing” inside the receiver’s circuitry (common to all receivers). Each press of the [ATT] key will toggle the attenuator ON and OFF.

The legends have the following meaning:

ATT	Attenuator legend represents ON, set is least sensitive.
	No legend. Set is most sensitive, attenuator OFF.

Note: Do not be confused by the “OFF” legend under the attenuator status, this refers to the IF SHIFT facility.

{figure 35}

1.7 IF Shift (WFM,AM,CW,USB,LSB only)

The AR7000 is equipped with an IF SHIFT control which can vary the centre frequency of the IF within a range of +/-8500Hz at a rate of 100Hz without affecting the received signal. This feature is very useful for moving the receive passband

away from adjacent channel interference, especially on the short wave and medium wave bands.

{figure 36}

Operating the IF Shift
Press the [IF SFT] key, the IF SHIFT legend will reverse to a negative image to confirm selection.

Each press of the [IF SFT] key will toggle the status between current value and OFF. Either rotate the main dial or press the [→] or [←] keys to vary the IF shift frequency as required. Press the [ENT] key when the optimum IF Shift frequency is obtained.

2 Dial Mode

Both types of **dial mode** (VFO-A) and (VFO-B) operate in exactly the same manner. Both are referred to here as **dial mode**.

2.1 Display

An example of the LCD display is shown here when **dial mode** is selected.

{figure 38}

Note: **Mch 03/02** represents the memory channel number 3 on the memory bank number 2.

2.2 Frequency Selection

Direct entry via key-pad
Push the numeric keys to enter the frequency in a MHz order followed by [ENT], use the decimal point after the MHz entry such as [8] [1] [.] [3] [ENT] for 81.300 MHz, there is no need to use proceeding or trailing zeros.

{figure 39}

Tuning via the main dial
Rotate the main dial while in **dial mode** to tune through the frequency spectrum at the pre-determined step size. Clockwise rotation increases frequency while ant-clockwise rotation decreases frequency.

2.3 Selection of frequency step

The step size cannot be altered while the AR7000 is in AUTO MODE (while the legend “AUT” displayed on the LCD), select another receive mode then press the [STEP] key.

The step frequency legend will reverse to negative image. Tap in an appropriate step size via the key-pad using kilo Hertz format (thousands of Hz) followed by [ENT],

i.e. for 25 kHz type [2] [5] [ENT]. Acceptable step size is anything between 0.01 kHz (10 Hz) and 1000 kHz (1 MHz). The back space key [←] will act as delete key if a mistake is made.

When AUTO MODE is selected, the step size is selected automatically by the AR7000 CPU appropriate to the market area, this is taken from a detailed bandplan entered into the AR7000 during manufacture.

{figure 40}

2.4 Selection of receive mode

The AR7000 provides the following receive modes:-

AUT: When auto mode is selected, the AR7000 automatically selects the appropriate step size, IF BW and receive mode on your behalf using its factory pre-programmed band plan data.

USB: Upper Side Band, used by radio amateurs, prolific on the HF bands. Also used by commercial HF utility stations.

LSB: Lower Side Band, used by radio amateurs below 10 MHz.

CW1: CW with a 400Hz beat tone, Continuous Wave = Morse code.
CW2: CW with a 600Hz beat tone
CW3: CW with an 800Hz beat tone

AM: Amplitude Modulation, LW, MW & HF broadcast, airband.

NFM: Narrow band Frequency Modulation, most point to point communications on VHF/UHF.

WFM: Wide band Frequency Modulation, Band-II VHF, TV

Selection of Receive Mode
Press the [MODE] key. The LCD legend displaying the receive mode will reverse to a negative image.

{figure 41}

Either rotate the main dial or press the [←] or [→] keys which carousel through the receive modes as per diagram. Press [ENT] when the desired receive mode is displayed.

{figure 42}

2.5 Selection of IF bandwidth

The AR7000 can be operated using the various bandwidths in accordance with the table below:-

{figure 43}

Receive Mode	**Selection of IF BW**
USB/LSB	2kHz, 2.5kHz, 3kHz
CW1,CW2,CW3	50Hz,150Hz,250Hz,500Hz,800Hz
AM	3kHz,6kHz,8kHz
WFM	150kHz
NFM *	15kHz-H, 15kHz-L

* NFM mode operates with a fixed 15kHz IF bandwidth but with the selectable option of wide audio frequency response (**15kH**) and narrow response (**15kL**).

The wider the filter, the better the audio fidelity… there is an increased chance of adjacent channel interference with a wider IF bandwidth. The best setting will depend upon listening conditions.

Selection of IF BW (IF bandwidth)
Press the [IF BW] key. The LCD legend displaying the IF BW will reverse to negative image. Either rotate the main dial or press the [←] or [→] keys to select an appropriate IF bandwidth. Press the [ENT] key when the desired IF BW is selected.

{figure 44}

2.6 Transfer data from dial mode to memory

Press the [FREQ] key while in the VFO mode, do not hold the key… just a quick tap will do! The current (top) frequency on the LCD will turn to a red colour. Press the [ENT] key to transfer the receive data (frequency, receive mode, AGC, ATT, SQ setting) to the next available memory channel of the present bank.

3 Memory mode

The AR7000 is equipped with a total of 1500 memory channels arranged as 15 memory banks 0 to 14, each containing 100 channels numbered 00 to 99. Each memory channel can be tagged with a text ident of up to seven characters.

3.1 Display

A typical example of the memory channel mode is as follows:

{figure 45}

The memory channel mode looks similar to the VFO mode with the following exceptions:-

1) A text ident (comment) may be shown should you choose.

{figure 45}

2) Memory channel number and memory bank number are shown as per the illustration:-

{figure 45}

3.2 Memory channel

In the memory channel mode, either rotate the main dial to select the memory channel or use the [←] [→] keys. Memory channels with no valid data will be ignored (skipped = not shown).

3.3 Memory bank

In the memory mode, press the [BANK] key. The LCD bank legend will reverse to a negative image. Either rotate the main dial or use the [←] [→] keys to select the memory bank. Press [ENT] when the desired bank number is displayed.

{figure 46}

3.4 Transfer data from memory to dial mode

While in memory channel mode, press the [FREQ] key (only a quick tap is required). The frequency of the displayed memory channel will turn red, press [ENT].

{figure 47}

The frequency data will be transferred to VFO-A (which is always the bottom displayed VFO while in memory recall mode).

{figure 48}

3.5 Memory data edit

Press the [EDIT] key while in the dial mode or memory channel mode. The memory edit menu will be displayed.

{figure 49}

Each press of the [↑] or [↓] key will move the “>” (red cursor) up and down. Place the cursor “>” along side the function which you would like to perform, followed by [ENT].

3.5.1 Channel Edit and Delete

When the Ch Edit/Del menu is selected (as per section 3.5) the LCD will show:-

{figure 50}

A Selection of memory channel to edit

Press the [EDIT] key to select the **memory function menu**. While the ">" cursor is along side the menu item "**Ch Edit/Del**", press the [ENT] key. The **memory edit menu** will be displayed, a quick press of the [←] or [→] keys will highlight the CHANNEL (00 to 99) and BANK numbers (00 to 14) as a toggle by displaying a negative image over the required selection (do not hold the arrow keys too long, just a quick press is required).

Rotate the main dial to scroll through memory channel numbers or bank numbers as appropriate. Memory channels with no valid data or items with no specific data stored will be displayed as "- - - -".

B Selection of data to edit

While in the memory edit menu, press the [↑] or [↓] key to move the red cursor ">" to the position where you wish to edit (frequency, mode, IF-BW, Name, Ch Pass, Ch Delete) followed by [ENT].

B-1 Change of frequency

Place the cursor ">" along side the receive **Freq**uency followed by [ENT]. The present frequency will change to a negative image. Tap in the new desired frequency via the numeric keypad followed by [ENT].

{figure 51}

B-2 Change of receive mode

Place the cursor ">" along side the receive **Mode** followed by [ENT]. The present receive mode will change to a negative image. Either rotate the main dial or press the [←] or [→] keys until the desired receive mode appears (USB, LSB, CW1, CW2, CW3, AM, NFM, WFM, AUT). Press [ENT] to confirm your selection.

{figure 52}

B-3 Change of IF-BW

Place the cursor ">" along side the **IF-BW** followed by [ENT]. The IF-BW will turn to a negative image. Either rotate the main dial or press the [←] or [→] keys until the desired IF-BW appears (the selection available depends on current receive mode). Press [ENT] to confirm your selection. When AUT has been selected as the current receive mode, IF-BW will be automatically selected by the AR7000 CPU mapped band plan, for this reason you cannot change the IF-BW when AUT receive mode is selected, the IF-BW will display "- - - -" and cannot be changed.

{figure 53}

B-4 Change of text/ident

Place the cursor ">" along side the test ident **Name** followed by [ENT].

{figure 54}

The **Name Edit** screen will be displayed. Your desired text ident may now be entered or edited. Use the [↑] and [↓] keys to select character line number, use the main dial to move along each line, use the [←] and [→] keys to move along the seven character text ident, use the [ENT] key to accept the input for each character. Other options include **Ins**ert, **Del**ete, **Spa**ce and **Quit**. Refer to section 7 of this manual for further details.

{figure 55}

B-5 Channel pass

Any memory channels which you would like to **skip** in **program scan** or **manual scan** can be registered as a pass channel. Place the cursor ">" along side the **Ch Pass** followed by [ENT], the ON/OFF legend will turn to negative image. Either rotate the main dial or press the [←] or [→] keys to toggle the pass status ON/OFF. Press the [ENT] key when the desired selection has been made.

{figure 56}

B-6 Delete

Place the cursor ">" along side **Ch Delete** followed by [ENT]. The currently displayed memory contents will be completely erased in one go and cannot be restored afterward.

{figure 57}

3.5.2 Copy

Press the [EDIT] key to select the **memory function menu**. While the ">" cursor is along side the menu item "**Ch Copy**" press the [ENT] key. When **Ch Copy** is selected the following screen will be displayed:-

{figure 58} {figure 59}

While in the Ch Copy menu, press the [↑] or [↓] key to move the red cursor ">" to the position where you wish to copy the memory **from** ("Source") and **to** ("Dist") followed by [ENT].

A Selection of original memory (source)

Press the [ENT] key when the cursor ">" is next to the "**Source**". The line represents CHANNEL (00 to 99) and BANK (00 to 14) numbers. The channel number will reverse to a negative image to conform selection. Press the [←] or [→] keys to toggle between channel number and bank number. Rotate the main dial to select the desired channel number and bank number respectively followed by [ENT].

{figure 60}

B Selection of distant memory (destination)

Press the [ENT] key when the cursor “>” is next to the “**Dist**”. The channel number of the distant memory will reverse to a negative image. Press the [←] or [→] keys to toggle between channel number and bank number. Rotate the main dial to select the desired memory channel and bank number for the distant memory channel. Press [ENT].

{figure 61}

C Executing copy

Now that both source memory and distant memory channel have been selected, press the [↑] and [↓] keys to move the cursor “>” next to the legend “**Copy**” then press [ENT]. The frequency and mode of the distant (destination) memory will change to that of the source memory… both memory channels are now identical.

{figure 62}

D Exit from COPY

To return to the “Memory Function” menu, either press the [ESC] key or move the cursor “>” to the “QUIT” legend then press [ENT], this terminates the copy session. You are now back to the memory function menu.

{function 63}

3.5.3 Move

All the memory function menus manipulate in a similar manner. When the “**Ch Move**” menu is selected via the memory function menu, the following screen will be displayed:-

{figure 64} {figure 65}

Press the [↑] and [↓] keys to move the cursor “>” next to the legend “Ch Move” then press [ENT].

A Selection of source memory channel

Press the [ENT] key when the cursor “>” is next to “**Source**”. The channel number will reverse to a negative image to conform selection. Press the [←] or [→] keys to toggle between channel number and bank number. Rotate the main dial to select the desired channel number and bank number respectively followed by [ENT].

{figure 66}

B Selection of distant memory channel

Press the [ENT] key when the cursor ">" is next to "**Dist**". The channel number of the distant memory will reverse to a negative image. Press the [←] or [→] keys to toggle between channel number and bank number. Rotate the main dial to select the desired memory channel and bank number for the distant memory channel. Press [ENT]

{figure 67}

C Executing the channel move

Now that both source memory and distant memory channel have been selected, press the [↑] and [↓] keys to move the cursor ">" next to the legend "**Move**" then press [ENT]. Memory contents will have been transferred to the distant channel, and the source channel is now empty with no memory contents.

{figure 68}

D Exit from the memory channel move

To return to the "Memory Function" menu, either press the [ESC] key or move the cursor ">" to the "QUIT" legend then press [ENT] to terminate the move session. You are now back to the memory function menu.

{figure 69}

3.5.4 Swap

All the memory function menus manipulate in a similar manner. When the "**Ch Swap**" menu is selected via the memory function menu, the following screen will be displayed:-

{figure 70} {figure 71}

A Selection of source memory channel

Press the [ENT] key when the cursor ">" is next to "**Source**". The channel number will reverse to a negative image to conform selection. Press the [←] or [→] keys to toggle between channel number and bank number. Rotate the main dial to select the desired channel number and bank number respectively followed by [ENT].

{figure 72}

B Selection of distant memory channel

Press the [ENT] key when the cursor ">" is next to "**Dist**". The channel number of the distant memory will reverse to a negative image. Press the [←] or [→] keys to toggle

between channel number and bank number. Rotate the main dial to select the desired memory channel and bank number for the distant memory channel. Press [ENT]

{figure 73}

C Executing the swap

Now that both source memory and distant memory channel have been selected, press the [↑] and [↓] keys to move the cursor ">" next to the legend "**Swap**" then press [ENT]. The memory contents of each channel are now swapped.

{figure 74} {figure 75}

D Exit from the swap

To return to the "Memory Function" menu, either press the [ESC] key or move the cursor ">" to the "QUIT" legend then press [ENT] to terminate the swap session. You are now back to the memory function menu.

{figure 76}

3.5.5 Bank delete

Move the cursor ">" along side the "Bank Del" legend of the "Memory Function" menu then press [ENT]. When "**Bank Del**" is selected, the bank number (currently displayed as "- -") will reverse to a negative image. Rotate the main dial or press the [←] or [→] keys to select the desired memory bank from which you wish to erase the contents. Press the [ENT] key to delete all memory data from the selected memory bank. All memory channels (of the selected bank) will be deleted in one go and the cursor will move back along side the "Bank Del" item of the menu.

{figure 77}

3.5.6 Terminate the memory edit

To return to memory channel mode, either press the [ESC] key or move the cursor ">" to the "QUIT" legend then press [ENT] to terminate the session. You are now back to the memory function menu.

{figure78}

4 Search and Scan

4.1 Definition and convention

It is important to understand the fundamental difference between SEARCH and SCAN modes.

Search:

The AR7000 steps through the frequency spectrum looking for transmissions, the squelch control needs careful setting so that the background noise is just cancelled, if the squelch is set too high, weak signals may be missed. The AR7000 steps through the spectrum using the selected mode and step size (including automatic selection using the automode bandplan data programmed into the AR7000 CPU). Unwanted active frequencies may be skipped using the PASS facility.

Manual Search: Steps through the frequency spectrum from the current displayed frequency in DIAL MODE. The legend "M.SEARCH" confirms operation. The main dial may be used to reverse the direction of manual search, a spectrum trace is displayed indicating progress.

Program search: The upper and lower frequency limits for the search process may be programmed along with receive frequency, step size and direction. The search process then takes place between these limits, looping back to the start when the end has been reached (depending on the programmed search direction options).

Scan:

The AR7000 quickly reviews the contents of the memory channels looking for activity. Different frequency bands and modes of reception may be scanned together.

Manual scan: The current bank only is scanned.

Program scan: Several banks and channels may be grouped together in a single scan adding great flexibility to the scan facility.

Note: It is normal to hear internal low volume "clicks" caused by relays inside the AR7000 when certain frequency banks are selected.

4.2 Display and Run/Brk

While the search/scan is in progress, the screen will display the spectrum analysis received so far (up to a maximum of 80 samples).

{figure 79}

This figure is a typical example of the LCD screen showing such activity. While the search/scan is in action, the legend "Run" is displayed on the LCD in a red box. The LCD legend "Brk" is displayed when the process is temporarily stopped.

Note: While the search/scan is in action only the following keys are operative:-

[RUN/BRK] [←] [→] [AGC] [SQL] [ATT] [IF SFT] [K.Lock]

The main dial and volume keys are also operative but other keys are disabled.

The squelch threshold is shown as a light blue horizontal line, when temporarily stopped, a vertical dark cursor bar indicates current receive frequency. The larger the signal received, the higher the green bars of spectrum analysis, however, there is no way of showing real time signal strength on the spectrum display (refer to the s-meter in the top left corner of the LCD for current signal strength).

4.3 Manual search

4.3.1 Run

Push the [RUN/BRK] key while in dial mode to start a manual search from the currently displayed frequency. The “M.SEARCH” legend will be displayed and the search will commence.

{figure 80}

The manual search process will stop as soon as an active signal above squelch threshold is received. The search will resume when such signal has disappeared. You can force the search to resume even if the signal is present by rotating the main dial. The search direction depends on the direction which the main dial is rotated or direction of the [←] [→] keys.

4.3.2 Brk (Break)

Push the [RUN/BRK] key while search is in progress to temporarily stop (break) the manual search process. The search will stop immediately and the legend ”Brk” will be displayed on the LCD.

{figure 81}

Rotate the main dial or use the [←] [→] keys to tune around the frequencies upward or downward within the limits of the currently displayed spectrum window, the dark vertical cursor will follow the movement accordingly.

4.3.3 Ending the manual search

Push the [ENT] key at any time to return to the dial mode while retaining the currently displayed frequency (transfer the frequency to VFO-A).

Push the [ESC] key to return to dial mode reverting to the frequency in use before the manual search was selected.

4.4 Manual scan

4.4.1 Run

Push the [RUN/BRK] key while in memory mode. The legend “M.SCAN” will be displayed on the LCD.

{figure 82}

The manual scan process will stop as soon as an active signal above squelch threshold is received. The scan will resume when such signal has disappeared. You can force the scan to resume even if the signal is present by rotating the main dial. The scan direction depends on the direction which the main dial is rotated or direction of the [←] [→] keys. If only a small number of memory channels have been selected (less than 80), the spectrum analysis trace may only occupy part of the LCD width. The vertical cursor will *bounce* between the two edges of the selected scan bank.

4.4.2 Brk (Break)

Push the [RUN/BRK] key while scan is in progress to temporarily stop (break) the manual scan process. The scan will stop immediately and the legend ”Brk” will be displayed on the LCD.

{figure 83}

Rotate the main dial or use the [←] [→] keys to tune around the memory channels upward or downward within the limits of the currently displayed spectrum window, the dark vertical cursor will follow the movement accordingly.

4.4.3 Terminate the manual scan

Push the [ENT] key while the scan is in progress. The AR7000 will revert to memory mode still retaining the current memory channel.

Push the [ESC] key to revert to memory mode with the previously selected memory channel displayed (before the scan first began).

4.5 Program search

Press the [SEARCH] key in the dial mode or memory mode. The “**Program Search**” menu will be displayed.

4.5.1 Selection of the program search bank

There are eight program search banks. A highlighted cursor is displayed on the current program search bank. Rotate the main dial to select the desired program search bank number (0 to 7), the program details displayed will help identify which bank is required.

{figure 84}

4.5.2 Run

Push the [RUN/BRK] key to start the program search action. The legends “P.SEARCH” and “Run” will be displayed on the LCD.

{figure 85}

When an active signal has been found the program search will stop. The search will resume when the active signal has disappeared and squelch closes, or in case of time controlled search, when a pre-determined time has elapsed. Rotate the main dial or use the [←] [→] keys to force the search to resume, you cannot reverse the direction of program search as it is defined in the programming menu.

4.5.3 Brk

Push the [RUN/BRK] key while program search is in progress to temporarily stop (break) the search process. The search will stop immediately and the legend ”Brk” will be displayed on the LCD. Rotate the main dial or use the [←] [→] keys to tune around the frequencies upward or downward within the limits of the currently displayed spectrum window, the dark vertical cursor will follow the movement accordingly.

{figure 86}

4.5.4 Terminate the program search

Push the [ENT] key or [ESC] key to revert to the Program Search menu screen.

Select “Quit” then push the [ENT] key to return to the dial mode while retaining the currently displayed frequency (transfer the frequency to VFO-A). If auto**Store** is on, this frequency will also be copied to the next available empty memory channel of the specified bank.

Push the [ESC] key to return to dial mode reverting to the frequency in use before the program search was selected.

4.5.5 Selection of the search parameter

A Selection of the parameter

Press [SEARCH] to access the Program Search menu.

Push the [↑] and [↓] keys to select the desired parameter which is to be altered, a red cursor “>” moves up and down alongside the parameters which are available for change. Push the [ENT] key to access each menu and use [ENT] to accept the changes or [ESC] to abort.

B Program name

Push the [ENT] key when the cursor is placed alongside the item “Name”. The name editor screen will appear ready to accept your desired text ident. Use the [↑] and [↓] keys to select character line number, use the main dial to move along each line, use the [←] and [→] keys to move along the seven character text ident, use the [ENT]

key to accept the input for each character. Other options include **Ins**ert, **Del**ete, **Spa**ce and **Quit**. Refer to section 7 of this manual for further details.

{figure 87}

C Stop time

Push the [ENT] key when the cursor is placed alongside the item “Stop Time”.

{figure 88}

Rotate the main dial or push the [←] [→] keys to select the desired stop time in seconds followed by [ENT].

SQ: The program search will stop as long as the signal stays above the squelch threshold, search will resume once the signal drops below squelch threshold and the squelch closes.

01 - 99: The program search will automatically resume as soon as the pre-determined stop time (in seconds) has elapsed even if the frequency is still active. If the squelch closes before stop time has elapse, search resumes immediately.

D Search direction

Push the [ENT] key when the cursor is placed alongside the item “Direction”. Rotate the main dial or push the [←] [→] keys to select the desired search direction followed by [ENT].

{figure 89}

FWD: The search starts from the **start** (lower) frequency and tracks upward in frequency toward the **stop** (upper) limit then hops down to the start frequency and the process repeats.

REV: The search starts from the **stop** (upper) frequency and tracks downward in frequency toward the **start** (lower) limit then hops up to the stop frequency and the process repeats.

LOOP: The search shuttles (bounces between limits) between the start and stop frequencies.

Link: The search starts from the start frequency and progresses to the stop frequency, then jumps to other program search banks which may have been linked (forming a large family of program search banks).

E Start frequency

Push the [ENT] key when the cursor is placed alongside the item “Start”. Enter the desired start frequency via the keypad followed by [ENT].

{figure 90}

***Note**: When inputting start and stop frequencies, the AR7000 automatically assigns the lower frequency to the START and upper frequency to the STOP regardless of which order then are entered.*

F End frequency

Push the [ENT] key when the cursor is placed alongside the item “Stop”. Enter the desired stop frequency followed by [ENT].

{figure 91}

G Step

Push the [ENT] key when the cursor is placed alongside the item “Step”.

{figure 92}

Enter the desired step size via the keypad in a kHz order followed by [ENT]. Acceptable step size is anything between 0.01 kHz (10 Hz) and 1000 kHz (1 MHz), invalid entries will be ignored. i.e. for a step size of 25 kHz, key [2] [5] [ENT]. Note that this sequence is inoperative when automode (AUT) has been selected (as the AR7000 CPU automatically selects step size using its pre-programmed bandplan data).

H Receive mode (Mode)

Push the [ENT] key when the cursor is placed alongside the item “Mode”. Rotate the main dial or push the [←] [→] keys to select the desired receive mode followed by [ENT].

{figure 93}

I IF bandwidth (BW)

Push the [ENT] key when the cursor is placed alongside the item “BW” (this is to the right of mode entry). Rotate the main dial or push the [←] [→] keys to select an appropriate bandwidth followed by [ENT]. Note that this sequence is inoperative when the auto mode (AUT) has been selected.

{figure 94}

J Auto store (Store)

Push the [ENT] key when the cursor is placed alongside the item “Store”. Rotate the main dial or push the [←] [→] keys to select one of the following positions:-

{figure 95}

O N: When active signals above the squelch threshold have been received, such signals will be automatically stored in the empty channels of the designated memory bank. When the memory bank becomes full, the auto store action will become invalid, the search process will carry on regardless.

OVW: When active signals above squelch threshold have been received, such signals will be stored from channel 00 up to channel 99 of the designated memory bank in sequence. This auto store sequence will continue between channel 00 and 99 overwriting the previously stored data.

OFF: The auto store is inoperative (disabled).

K Store bank (Bank)

Push the [ENT] key when the cursor is placed alongside the item “Bank”. Rotate the main dial or push the [←] [→] keys to select the desired memory bank (00 to 14) to be used for auto store of active frequencies, then press [ENT].

{figure 96}

L Pass bank

Push the [ENT] key when the cursor is placed alongside the item “Pass Bank”. Rotate the main dial or push the [←] [→] keys to select the desired pass bank (00 to 14) to be used, alternatively select “- -“ to disable the pass facility then press [ENT].

{figure 97}

M Quit

Push the [ENT] key when the cursor is placed alongside the item “Quit”. The LCD will revert to whatever mode was active before the program search menu was selected.

4.6 Program scan

Press the [SCAN] key in the dial mode or memory mode. The “**Program Scan**” menu will be displayed.

{figure 98}

4.6.1 Selection of the program number

There are eight program scan groups. In the program scan menu screen rotate the main dial to select the desired program scan group number from 0 to 7.

4.6.2 Run

Having selected the desired program scan number, push the [RUN/BRK] key to start the program scan.

{figure 99}

The scan process will temporarily stop when an active signal above the squelch threshold has been received. The scan process will resume when such signal has disappeared. In the case of time control scan, the scan process will resume as soon as the pre-determined stop time has elapsed or when the squelch closes should this occur first (transmission ends). While the scan process has temporarily stopped, rotate the main dial or press the [←] [→] keys to force the scan to resume.

4.6.3 Brk

To suspend program scan, press the [RUN/BRK] key while the scan is in progress. The scan action will be suspended and the legend “Brk” will be displayed on the LCD.

{figure 100}

Rotate the main dial or press the [←] [→] keys to step through other channels within the spectrum display limits of the active LCD window. A dark vertical cursor indicates current frequency.

4.6.4 Terminate the program scan

Push the [ENT] or [ESC] key to stop the scan action immediately and return to the program scan menu screen.

4.6.5 Selection of the scan parameter

A Selection of the parameter

Push the [↑] and [↓] keys to select the desired parameter which is to be altered, a red cursor “>” moves up and down alongside the parameters which are available for change. Push the [ENT] key to access each menu and use [ENT] to accept the changes or [ESC] to abort.

B Name

Push the [ENT] key when the cursor is placed alongside the item “Name”. The name editor screen will appear ready to accept your desired text ident. Use the [↑] and [↓] keys to select character line number, use the main dial to move along each line, use the [←] and [→] keys to move along the seven character text ident, use the [ENT] key to accept the input for each character. Other options include **Ins**ert, **Del**ete, **Spa**ce and **Quit**. Refer to section 7 of this manual for further details.

{figure 101}

C Stop time

Push the [ENT] key when the cursor is placed alongside the item “Stop Time”. Rotate the main dial or push the [←] [→] keys to select the desired stop time in seconds followed by [ENT].

{figure 102}

SQ: The program scan will stop as long as the received signal stays above the squelch threshold, scan will resume once the signal drops below squelch threshold and the squelch closes.

01 - 99: The program scan will automatically resume as soon as the pre-determined stop time (in seconds) has elapsed even if the frequency is still active. If the squelch closes before stop time has elapse, scan resumes immediately.

D Scan direction

Push the [ENT] key when the cursor is placed alongside the item “Direction”. Rotate the main dial or push the [←] [→] keys to select the desired search direction followed by [ENT].

{figure 103}

FWD: The scan starts from the **start** ch/bank and scans toward the **stop** ch/bank then hops down to the start ch/bank and the process repeats.

REV: The scan starts from the **stop** ch/bank and scans toward the **start** ch/bank then hops to the stop ch/bank and the process repeats.

LOOP: The scan shuttles (bounces) between the start and stop ch/bank limits.

Link: The scan starts from the start ch/bank and progresses toward the stop ch/bank, then jumps to other program scan groups which may have been linked (forming a larger group).

E Start

Push the [ENT] key when the cursor is placed alongside the item “Start”. Enter the desired start channel and bank using the main dial and [←] [→] keys followed by [ENT].

{figure 104}

F Stop channel

Push the [ENT] key when the cursor is placed alongside the item “Stop”. Enter the desired stop channel and bank using the main dial and [←] [→] keys followed by [ENT].

{figure 105}

G Quit

Push the [ENT] key when the cursor is placed alongside the item “Quit”. The LCD will revert to whatever mode was active before the program scan menu was selected.

5 Search pass/bank

The AR7000 has a PASS facility which enables unwanted busy frequencies to be skipped during the scan and search processes.

5.1 Common pass bank

Memory bank number 14 has been assigned the *special status* of PASS BANK. Any number of up to 100 frequencies stored in this memory bank will be ignored (skipped) during the search and scan sequences.

{figure 106}

5.2 Program pass bank

In addition to the **common pass bank**, any one of the 14 banks (00 to 13) may be assigned as an **additional pass bank** for **program search**. This makes a total of 200 frequencies (100 for the common pass bank plus a further 100 for the additionally assigned pass bank). Refer to section 4.5.5.L of this manual for further information regarding usage of the pass bank facility.

6 Other parameters

Push the [CONF] key in the dial mode or memory mode to access the configuration menu. (The software version shown in this example is for reference only.)

{figure 107}

Push the [↑] and [↓] keys to select the desired parameter which is to be altered, a red cursor “>” moves up and down alongside the parameters which are available for change. Push the [ENT] key to access each menu and use [ENT] to accept the changes or [ESC] to abort.

6.1 Beep

Push the [ENT] key when the cursor is placed alongside the item “Beep”.

{figure 108}

Rotate the main dial or push the [←] [→] keys to toggle the beep ON/OFF. Push the [ENT] when the selection has been made.

6.2 Time

The AR7000 is equipped with one main clock plus four sub-clocks. Push the [ENT] key when the cursor is placed alongside the item “Clock Setup”. Items relating to the MAIN clock are prefixed “M” and the SUB-clock are prefixed “S”.

{figure109} {figure 110}

6.2.1 Main clock adjustment

When setting the MAIN clock, it doesn’t matter which sub-clock number (“Clock No.”) is displayed (1 to 4).

A Date

Place the cursor alongside “M. Date” then press [ENT]. Push the [←] [→] keys to alternate the position between Year, Month and Date. Rotate the main dial to select the correct Year, Month and Date followed by [ENT].

{figure 111} {figure 112} {figure 113}

B Hour

Place the cursor alongside “M.Time” then press [ENT]. Push the [←] [→] keys to alternate the position between Hour, Minute and Second. Rotate the main dial to set the correct time followed by [ENT].

{figure 114}

C Name

Place the cursor alongside “M.Name” then press [ENT]. The name editor screen will be displayed (refer to section 7 of this manual for further information on the name editor). You can write an appropriate name for the time zone using a maximum of seven characters.

{figure 115}

6.2.2 Sub-clock adjustment

A Selection of sub-clock

In the time selection menu, rotate the main dial to select any appropriate sub-clock by number (Clock No. 1 to 4).

{figure 116}

A-1 Time difference

Place the cursor alongside “S. Diff”, press [ENT]. The time difference will be reverse highlighted on the LCD, rotate the main dial to set the correct time difference (in hours between -24 and 24 hours, 0 being the current time zone of the main clock), followed by [ENT]. The local time and date is calculated by the AR7000 and displayed in green in the lower half of the LCD.

{figure 117}

A-2 Name

Place the cursor alongside “S.Name” press [ENT]. The name editor screen will be displayed (refer to section 7 of this manual for further information on the name editor). You can write an appropriate name for the time zone using a maximum of seven characters.

6.3 Timer

The AR7000 has five built-in timers which enable the radio to be automatically switched on and off at preset times, this is very useful for unattended tape recording of interesting broadcasts etc.

While in the “Configuration” menu, place the cursor alongside “Timer Setup” then press [ENT]. The timer set-up menu screen will be displayed.

{figure 118} {figure 119}

6.3.1 Selection of timer

Rotate the main dial to select one of the five timers 0 to 4.

{figure 120}

6.3.2 Date

The cursor will initially be placed alongside “Date”, press [ENT]. Set the date you wish the timer to become active, the current day is 00, tomorrow is 01 to a maximum of 31 days. Use the main dial or [←] [→] keys select the date then press [ENT]. When you select the date as “00”, the timer will activate **daily**.

{figure 121}

6.3.3 Hour

Place the cursor alongside “Time”, press [ENT]. Push the [←] [→] keys to alternate between **hour** and **minute**. Rotate the main dial to select the hour and minute you wish the timer to activate then press [ENT].

{figure 122}

6.3.4 Operation of timer

Place the cursor alongside “Operation”, press [ENT]. The field initially displays “- - -“. Rotate the main dial to alternate between “POWON” and “POWOFF”. Push the [ENT] key to complete the sequence.

{figure 123}

A Setting the timer for switch-on

1. In the timer selection menu place the cursor alongside “Date” followed by [ENT]. Rotate the main dial to select the date required for switch on followed by [ENT]. The current day is 00 with 31 being the maximum number of days ahead, selecting 00 will cause the timer to *event* every day.

{figure 124}

2. Place the cursor alongside “Time” followed by [ENT]. Rotate the main dial to select the hour/min, the [←] [→] keys are used to alternate between hours & minutes. Complete the input with [ENT].

{figure 125}

3. Place the cursor alongside “Operation” followed by [ENT].

{figure 126}

Rotate the main dial to toggle between “POWON” and “POWOFF”. Select “**POWON”** in this example followed by [ENT].

4. To ***arm*** the timer, place the cursor alongside “Power Off” followed by [ENT]. You can alternatively push the [POWER] key from the infrared remote controller when pointed at the AR7000 front panel sensor for the same effect.

{figure 127}

5. The AR7000 will immediately switch off and will automatically switch on at the pre-set hour/day. The AR7000 front panel power switch must remain depressed and d.c. power applied to the radio at all times while the timer is armed.

B Setting the timer for switch-off

1. In the timer selection menu, select the date the AR7000 is to be switched off.

2. In the timer selection menu, select the hour/minute the AR7000 is to be switched off.

3. Select the “Operation” item and choose “**POWOFF**” followed by [ENT].

4. The AR7000 will remain active until the preset date and time has arrived then will automatically switch off. There is no need to move the cursor to the “power Off” item, simply carry on using the AR7000 as usual.

5. Once the timer has switched off the AR7000, press the front panel power switch twice (once to latch out then again to latch in - off/on). Alternatively, the [POWER] key of the infrared remote controller may be pressed twice (quickly) when pointed at the front panel sensor of the AR7000 for the same effect.

{figure 128}

6.3.5 Clear the timer

In the timer menu, place the cursor alongside “Clear” followed by [ENT]. Each of the five timer settings (0 to 4) can be cleared this way, one by one.

It is advisable that the timer setting is cleared when no longer required to prevent ‘apparent’ sudden unexpected switch-off of the AR7000!

{figure 129}

6.4 Delay

The search/scan resumption time can be varied in the “Configuration” menu. Place the cursor alongside “Delay” followed by [ENT]. Rotate the main dial or push the [←] [→] keys to select the desired value followed by [ENT]. The valid delay time range is between 100mS (0.1 seconds) and 9900mS (9.9 seconds) in increments of 100mS (0.1 seconds).

A delay of 2 to 3 seconds (2000mS to 3000mS) allows sufficient time for aircraft and control towers to ‘hand over’ transmission without the AR7000 scanning/searching off before the conversation has completed. A small setting of 0.1 second (100mS) is ideal for duplex traffic enabling the AR7000 to quickly locate the ‘other half’ of the transmission, such as VHF marine.

{figure 130}

6.5 Squelch tail

The squelch tail can be varied in the “Configuration” menu. Place the cursor alongside “SQ Tail” followed by [ENT]. Rotate the main dial or push the [←] [→] keys to select the required value followed by [ENT]. The squelch tail is selectable between 20mS and 500mS in 10mS increments. Varying the squelch tail can be useful to prevent the AR7000 assuming that the squelch has closed (so resuming scan/search) simply because the transmission is ‘fluttering’, especially when mobiles

are involved. The more erratic the transmission, the longer the squelch tails should be.

{figure 131}

6.6 Priority

Any one of 1500 memory channels can be designated as priority channel.

6.6.1 Priority time

In the “Configuration” menu screen, place the cursor alongside “PrioTime” followed by [ENT]. Rotate the main dial or push the [←] [→] keys to select the desired value followed by [ENT]. Priority time is selectable between 1 second and 60 seconds in increments of 1 second. Select OFF if the priority facility is not required.

The AR7000 will check for activity on the priority channel every few seconds as set in priority time (unless disabled by selecting OFF). If a transmission is encountered on the priority channel, the AR7000 will monitor the traffic. Of course valid data must be stored in the nominated priority channel.

{figure 132}

6.6.2 Priority channel

In the “Configuration” menu screen, place the cursor alongside “PrioCh” followed by [ENT]. Rotate the main dial to select (nominate) the desired memory channel/bank, use the [←] [→] keys to toggle between BANK and CHANNEL number. Accept the input by pressing [ENT].

{figure 133}

7 Name editor

Each memory channel or program search/scan can be given a specific name via the name editor menu screen.

7.1 Display screen and descriptions

Refer to the following examples:

{figure 134}

1. Input line

The name you are writing will be displayed on this line, a maximum of 7 characters may be entered.

2. Input cursor

The cursor indicates the position where input will be made.

3. Select cursor

The select cursor indicates a selection of letter/number you want to input.

4. Command

Place the cursor over these commands followed by ENT to execute the following:-

Ins:	Insert selected character
Del:	Delete this character
Spc:	Space (add a blank space)
Quit:	Quit (exit this menu)

7.2 Key operation

Refer to the key sequence for the name editor as follows:-

[↑] key:	Move the select cursor upward.
[↓] key:	Move the select cursor downward.
[←] key:	Move the input cursor to left.
[→] key:	Move the input cursor to right.
Main dial:	Move the select cursor left/right.
[ENT] key:	Confirm the entry.
[ESC] key:	Cancel the entry.

7.3 Write the name

Push the [ENT] key when the cursor is placed alongside the item “Name”. The name editor screen will appear ready to accept your desired text ident. Use the [↑] and [↓] keys to select character line number, use the main dial to move along each line, use the [←] and [→] keys to move along the seven character text ident, use the [ENT] key to accept the input for each character. Repeat the same key sequence until the name is complete.

Place the select cursor over the “Quit” command followed by [ENT] to accept and terminate the sequence. Push the [ESC] key at any stage to cancel the sequence returning to whatever menu was in use before the name editor was selected. Other options include **Ins**ert, **Del**ete, and **Spa**ce.

8 AV output

The AR7000 can be connected with external video monitor or audio equipment via these sockets.

8.1 Video output

PAL and NTSC composite output is switchable via the rear panel video switch. When PAL format is selected the built-in LCD display will be inoperative. Video output is available via the rear panel video PHONO socket.

8.2 Audio output

Constant audio output is available via this PHONO socket, a load impedance of 10k OHMS is assumed for constant level output.

9 RS232C

The AR7000 can be operated remotely by a personal computer via the RS232C socket. A separate RS232 command list may be available from the AOR web site or head office. First check ***http://www.aorja.com*** or contact Kiyo Oshima at AOR Ltd, Japan for further details.

AR7000	**PC 9-way**	**PC 25-way**
2	2	3
3	3	2
5	5	7 (GND)
7	7	4
8	8	5

When making an RS232 cable, always use good quality screened cable to minimise noise.

10 AUX

A rear panel 270° 8-pin DIN socket provides the following signals:-

Pin No.	**IN/OUT**	**Signal**	**Description**
1	Out	+12V	+12V, 10mA output
2	-	GND	GND
3	In	Mute input	5V TTL
4	NC	NC	NC
5	Out	AF out	Tape Rec 10k ohm
6	Out	Rec out	SQ operated switch
7	Out	Rec out	SQ operated switch
8	NC	NC	NC

11 Infrared remote controller

The AR7000 can be operated via the supplied infrared remote controller. Aim the front of the remote at the front panel IR sensor to the AR7000. Most IR keys mimic those of the AR7000 and menus. The IR [POWER] key is valid ***only*** when the power switch of the receiver is switched on (depressed). The IR uses 2 x AAA batteries,

check the condition of the batteries regularly to avoid damage due to leakage from exhausted batteries.

12 Reference data

12.1 Specification

Frequency range	100kHz - 2000MHz
Receive mode	FM (W), FM (N), AM, CW, USB, LSB
Receiver circuitry	Triple superheterodyne & digital conversion
IF frequency	1st=275.4MHz,782.28MHz, 2nd=45MHz, 3rd=10.7MHz
Step size	10Hz - 1MHz in a 10Hz increment

Sensitivity (uV) *typical*

Range	AM	CW/SSB	NFM	WFM
100kHz - 700kHz	4.2	1.6	4.0	-
700kHz - 20MHz	3.5	1.5	2.0	-
20MHz - 1200MHz	1.3	0.5	0.56	1.3
1200MHz - 2000MHz	4.0	2.0	1.6	3.5

Selectivity

Bandwidth	Mode	Pass band (-3dB)	Stop band (-50dB)
50Hz	CW	75Hz	330Hz
150Hz	CW	200Hz	680Hz
250Hz	CW	330Hz	920Hz
500Hz	CW	550Hz	1050Hz
800Hz	CW	880Hz	1650Hz
2kHz	SSB	2150Hz	2900Hz
2.5kHz	SSB	2650Hz	3450Hz
3kHz	SSB	3150Hz	3950Hz
3kHz	AM	3650Hz	5000Hz
6kHz	AM	6650Hz	8000Hz
8kHz	AM	8700Hz	10kHz
15kHz	NFM	25kHz -40dB	
150kHz	WFM	650kHz -20dB	

IF shift	+/-8.5kHz (max) at 100Hz step
Audio filter	2.5 / 3kHz (NFM 7.5kHz (WFM)
CW tone	400 / 600 / 800 Hz
Audio output	1.0W (8 OHM THD 10%)
Power requirements	12V (+15%, -10%)
Current consumption	1.5A (at 1.0W audio)

	0.1A (switched off)
Memory	
Memory channel	1500ch (15 bank x 100ch)
Program search	8
Program scan	8
Program timer	5
Clock	5
Scan/search rate	20ch/sec.
In/output	
Aerial connector	50 OHM BNC
Video output	75 ohm PAL/NTSC composite (PHONO)
Audio output	10 k ohm demodulated output
External speaker	8 OHMS 3.5mm jack
Headphones	32 OHMS (nominal) 3.5mm jack
AUX	Motor On/Off output less than 300mA AC/DC
Rec output	more than 10 k ohm
Mute	TTL or contact signal
+12V out	less than 10mA (in line with main switch)
RS232C port	9 pin 9600 bps
Remote controller	Infrared type (1 line)
LCD display	3.1" colour LCD
Operating temperature	0 to +40°C
Dimensions (mm)	220 (W) x 90 (H) x 240 (D) excluding projections
Weight	3.5kg
Supplied accessories	AC adapter, IR remote controller, Handbook

All specifications/data subject to change without notice due to continuous development of the product. E&OE.

12.2 memory channel default data

The AR7000 memory banks may contain data for test purposes during manufacture of the receiver.

12.3 Trouble shooting

1. No operation

✶Check that power is connected to the AR7000 and the power switch is on (depressed).

2. No display

✶Providing the AR7000 is powered, ensure the rear panel PAL/NTSC slide switch is set to NTSC otherwise the internal display will be disabled.

3. Inoperative keys

✶Ensure that the “Lock” legend is not displayed in the lower-left corner of the LCD, if it is, press the [K.Lock] for more than one second to toggle key lock off / on.

✶The primary function of keys requires a very short press (tap), if you hold them too long you may activate the second function or the keys may appear to be inoperative.

✶If you get stuck in a particular menu (and the [ESC] key doesn’t help), it may be worth switching the unit off, count to five then switch it back on again.

✶In the case of the infrared controller, ensure that the batteries are in good condition and the front on the controller is pointed directly at the AR7000 IR front panel sensor.

4. Poor performance

✶Ensure that you have selected an active frequency and are using an appropriate receive mode and IF bandwidth, ensure that excessive IF SHIFT has not been applied.

✶Check that the squelch control is not fully advanced, set it temporarily to “OPEN” and try again.

✶Ensure that a suitable aerial is connected to the BNC aerial input and no short circuits exist in the coaxial cable or plugs.

✶Check to see if the “ATT” legend is displayed near the top right of the LCD, if it is, the receive performance will be reduced. Press the [ATT] key for more than one second to disengage the attenuator.

12.4 Optional accessories

✶DA3000
Wide band VHF/UHF 16 element discone aerial with frequency coverage from 25MHz to 2GHz. Supplied with 15m of coaxial cable terminated in a BNC plug.

✶SA7000
Two element passive wide band aerial. The VHF element is 0.7m and the HF element is 1.8m in length. Frequency coverage is 30kHz to 2GHz. Supplied with 15m of coaxial cable terminated in a BNC plug.

✶MA500
Mobile magnetic mounted aerial with frequency coverage from 25MHz to 1300MHz. Supplied with 4m of coaxial cable terminated in a BNC plug.

✶LA320

Table-top active short wave loop aerial. Supplied with two elements as standard covering from 1.6MHz to 5.0MHz and 5.0MHz to 15MHz. Operates from internal 9V battery. Supplied with BNC to BNC coaxial patch lead.

✶LA320M
Low frequency *optional* element for the LA320 active loop aerial system. Frequency coverage is 200kHz to 540kHz.

✶LA320M
Medium frequency *optional* element for the LA320 active loop aerial system. Frequency coverage is 540kHz to 1.6MHz.

✶ABF125
Airband filter for the VHF band 108 to 136 MHz. Fitted with BNC male/female connectors.

12.5 After sales service

There are no user serviceable parts inside the AR7000. In the unlikely event of failure, first check through the suggestions listed in section 12.3 of this manual. If the problem persists, please contact your supplier who will advise you of the after sales procedure.