AR900

Instruction Manual

Quick Start

For those, and that is the vast majority of us, who want to listen to something immediately and read the Instruction Manual later, please carry out the following steps:-

1.Fit the thinner of the two aerials (push on and turn).

2.Turn squelch (SQ) control fully counterclockwise.

3. Turn volume (VOL) control clockwise to a comfortable listening level.

4. Turn squelch clockwise until the background noise stops.

5.Press the following keypad buttons in order -
Search Progm. *If the letters* FM *show in the middle right hand edge of the display, move to the next step, but if* AM *shows press* AMFM *until* FM *shows.*

Next step - press 9,3,6,ENT,PRY LL/UL, 9, 4, 0, ENT, and then press LOCKOUT/INC *until 12.5 shows at the top of the display slightly right of centre,* ENT, SEARCH *(*NOT search progm*). The AR900UK should, if the battery is not flat, start searching part of the Cellular telephone band and you should hear signals. If the search stops on a signal which is unintelligible, pressing* SEARCH *(not search progm) will restart the search. If the AR900UK does not seem to be working properly, the battery may be flat - charging instructions follow a bit further on, but be absolutely sure you have carried out the above instructions to the letter before giving up in despair.*

INTRODUCTION.

The AR900UK is manufactured by A.O.R. Limited of Japan whose products, going back a long time, have gained a world-wide reputation for both performance and reliability second to none. It has been carefully engineered and manufactured to a rigid specification capable of giving satisfactory and dependable operation for many years.

After unpacking, it is as well to keep the packing material in case it should ever be needed for remote operation, maintenance or service, and check that it is supplied with the following accessories:

1 - AC Adaptor/Charger. Input 240VAC 50Hz 5W.
Output 6VDC 200mA.

It will be necessary to attach a mains plug to this unit suitable for fitting into a standard domestic power socket.

2 - Flexible helical whip aerials, one slightly thicker than the other.

1 - Instruction Manual.

Before using the charger for the first time we recommend that the battery be fully discharged by switching on the dial light. When this goes out or the "bat low" warning appears on the display, switch it off, plug one end of the charger into the mains, the other end into the AR900UK charger socket marked "CHG DC6V", and charge for 8-10 hours. The reason for this procedure is that Nickel Cadmium (NiCad) batteries may acquire what has been described as a "memory" which subsequently gives rise to difficulty in charging them fully. This full discharge/charge cycle at the outset minimises this problem and ensures that optimum battery usage is achieved. *Note that during the initial discharge you can use the AR900UK, but it will, in all probability, soon start to die on you as the battery gets flatter and flatter. The same thing applies to the initial charge - it will take several minutes to start coming to life again, but after that there is no reason why you should not use it, but I would be inclined to leave the dial light off.* One other thing to remember - if you use the AR900UK during the charging cycle, then the charging time should be increased to compensate. As overcharging is not unduly harmful it is not necessary to set the alarm for 3 a.m. to switch the charger off - up to 16 hours once in a while will not hurt. Repeating this rapid discharge/full charge cycle three or four times is not a bad idea and results in the NiCads reaching their full capacity of 7 to 9 hours normal usage. Subsequently, an overnight charge or a charge while you are at work when the low battery (Bat-Low) warning appears on the display is all that is necessary. As for the total life of the NiCads - hard to say - depends not only on usage but many other factors, but I would be a bit disappointed if they only lasted a year and delighted if they lasted four. Fortunately they do not cost the earth to replace.

Operating modes.

The AR900UK can be used in three different ways. In the MANUAL mode, any frequency within the tuning range may be entered into any of the 100 memory channels (A01 to E20) and recalled by entering the appropriate channel number. Additionally, repeated pressing of MANUAL goes through the memories sequentially, tuning to the different frequencies in them. The second mode of

operation is the SCAN facility whereby up to 100 frequencies are manually put in the memories and then rapidly scanned. Should there be a signal present, the AR900UK will stop scanning to permit the signal to be heard. The 100 memories are in 5 (A,B,C,D,and E) banks of 20 and any bank or combination of banks may be scanned. One popular method of use is to have local airfield and airways frequencies in one bank, Radio Amateurs in another, Private Mobile Radio in a third, cellular car 'phones in a fourth and so on, scanning the bank or banks of current interest. Should interest in one or more frequencies temporarily wane, that frequency or frequencies may be temporarily locked out by pressing the LOCKOUT/INC key. Pressing a second time brings the frequency back into the scan. The SCAN operation presupposes that the user knows firstly what frequencies to put in the memories and secondly whether the transmission is AM or FM. There are several books which list various frequencies and your Dealer will be happy to advise. As to whether a transmission is AM or FM, a good general rule is that all airband, civil and military are AM, anything else is FM, but if in doubt, trying both will determine which is correct. For the beginner who has little or no idea of what frequencies are in general use in his area, the third mode of operation comes into its own. This is the search mode, and in this mode the AR900UK will scan between two programmable limits, stopping wherever there is a signal.An example of this mode of operation was given at the start of this manual. A good starting point is to consult the "Band Plan" listed further on and decide what you would like to listen to. Take a small portion of the band and search that portion noting any interesting frequencies or putting them directly into a memory bank by use of the HOLD facility described later. Having exhausted the possibilities of that particular portion, repeat over the next portion, and so on, not attempting to search more than a 1MHz portion at a time, otherwise there is a strong possibility that some transmissions will be missed. After 20 frequencies have been entered into a memory bank, it will, of course, be necessary to start a fresh bank.

CONTROLS.

Firstly a description of the various switches and keys.

TOP PANEL.

VOLUME — Controls the volume and is also the on/off switch.

SQUELCH — Mutes the background noise, which, particularly in the FM mode, tends to be most objectionable. *Note that in order for the AR900UK to scan or search, it is essential to use the squelch control.* The best position for this control is when the noise is just, but only just, muted, otherwise sensitivity suffers slightly.

KEY LOCK — This disables the keyboard to prevent accidental errors.

LAMP — This illuminates the display, but also rapidly discharges the battery.

FRONT PANEL

SEARCH — In the search mode, it initiates the search.

SEARCH PROGM — In the search mode it is used to programme the upper and lower limits of the search.

SCAN — In the scan mode it initiates the scan.

PRY LL/UL — This is a dual function key. used in the search mode to set lower (LL) or upper (UL) limits to the search. The other function is, in the scan mode, to make memory A01 a priority channel. Every 7 seconds or so A01 is examined and if a signal is present that signal takes priority over all others.

MANUAL — The key which enables frequencies to be entered and permits manual examination of the memories.

LOCKOUT /INC — This is a dual function key which stops the reception of unwanted signals in the scan or manual modes. It also selects the frequency steps in the search mode.

DELAY HOLD — This is a dual function key. The delay function operates in both the scan and search mode to hold the frequency of a received signal for about 5 seconds after the transmission has ended. The hold facility operates in the search mode only and holds the signal frequency as long as desired. This gives the user a chance to

make a note of the frequency or put it directly into one of the memories simply by pressing **ENT** followed by the memory location (e.g. C09). Searching resumes on pressing **SEARCH.**

AM/FM This selects AM or FM during initial programming (*generally speaking everything outside the Air Band is* FM).

THE RED 4 and 7 In the search mode, it is possible to obtain manual operation, stepping up or down by repeatedly pressing one of these keys, or altering direction of the search, resuming by pressing the search key.

CLEAR If an error is made when programming a frequency, the clear key may be used to erase it.

0 - 9 Frequency entry keys.

ENT Enters a frequency into the memory from manual, scan, or search programme modes.

A - E Selects from one to five memory banks.

DISPLAY In addition to the frequency, the display shows the memory bank or banks in use (**A - E**), the search increment (**5,10,12.5 or 25kHz**), mode (manual **MAN**, scan **SCAN**, search **SRCH** or search programme **PROG**), delay (**DLY**) or hold (**HLD**), priority (**PRY**),Direct access (**DIR-ACC**), **AM** or **FM** mode, lockout of a scan channel (**L/O**), low battery indicator (**Bat-low**), memory bank and channel number.

OPERATION.

SEARCH MODE. To look for active frequencies within a chosen range press **SEARCH PROGM**, one of the letters **A - E, AMFM** to select mode (*Usually FM outside the Airband*). the lower limit frequency may now be entered (*the decimal point may be ignored*) followed by pressing the **ENT** key. To enter the upper limit, press the **PRY LL/UL** key followed by the frequency and then **ENT**. The search increment may now be selected by pressing **LOCKOUT/INC** followed by **ENT** then press **SEARCH**. The AR900 will start searching the selected frequency range. ***Note that recommended search increments are***

incorporated in the Band Plan and that it is wise to limit the search to about 1MHz to avoid missing anything. Also Note the use of the hold facility - an active frequency may be held and entered into a memory simply by pressing **ENT** *and then a memory channel (e.g. D12) pressing* **SEARCH** *to restart. The only problem is that it will replace anything that is already in D12 which is then lost, so it is essential to keep track of what memories are used. Also Note the use of the* **red 4 and 7** *keys described above. The only other point to remember is always to enter the upper and lower limit frequencies by pressing* **ENT** *even if they are already displayed.*

SCAN MODE.

Assuming that you have found a few frequencies or know frequencies which you would like to scan, press **MANUAL**; select bank and channel by **ENT, A,B,C,D,** or **E,** (*note that* **DIR ACC** *appears on the display because this is how channels are directly accessed in the manual mode*) followed by a number 01 - 20. The frequency displayed is that which is already in the memory, so be sure it is no longer needed because it will be lost when a new frequency is entered. If it is needed, simply re-enter a different channel number. If the AR900UK is new, the frequencies entered are merely those used for our pre - sales check and are of no significance. Enter the desired frequency by the numeric keys (*the decimal point and final 0 or 00 may be ignored*), select AM or FM (Airband AM) and press **ENT**. Repeat this process for other channels. Scanning is started (*or restarted*) by pressing **SCAN**. Whilst scanning, banks may be temporarily added or deleted by one or more of the letter keys A - E. These act as an on/off switch - press once to switch from on to off, or vice versa, and again to reverse the process. Channels not of current interest may be locked out by the use of **LOCKOUT/INC**, and the lockout removed by accessing the channel in the manual mode and again pressing the **LOCKOUT/INC** key. The **DELAY HOLD** key, if pressed will activate the delay of about 6 seconds, a second press removing it. For correct operation of

SCAN and SEARCH modes, the DELAY should always be set.

The scan may be stopped by pressing **MANUAL**, and stepping through the memory channels achieved by repeatedly pressing **MANUAL**. A01 is the priority channel and is switched in or out by the **PRY LL/UL** key. Remember that the AR900UK must be squelched before it will scan but that every synthesized receiver has certain "birdies" which cannot be silenced by the squelch control, and it may be necessary to restart the scan by pressing the **SCAN** key.

MANUAL MODE. Virtually every aspect of this mode has already been covered, so nothing can be added. This completes the operating of the AR900UK, but the following one or two notes may be of interest.

AERIALS.

There are two aerials supplied, the thinner more suitable for frequencies above 400MHz and the thicker for below this. If you are scanning a mixture of frequencies, it is a question of trying both aerials to see which performs best. Slightly greater range will result by using an extending whip aerial, trying it at different lengths, but with the snag that it is more prone to damage both itself and anyone close-by. Although connection of an outside aerial system such as a discone or ground plane on the house roof will often produce better signal strengths, such aerials will generally produce blocking or overloading effects on the AR900UK, which is designed to operate with the aerials supplied. Your Dealer will be able to advise and supply suitable aerials, or reading any of the books on scanners (*our own little pamphlet makes sound sense*) will aid your understanding of the factors involved. Some form of roof aerial is to be recommended when using the AR900UK in the car - if you have a favourite band, an aerial for that band is a good idea and again your Dealer can advise.

QUERIES.

Years of experience have led us to lump the queries into four types:-

1. **"Why can I hear much more on my £9.95 Hong Kong Super Airbander?"** Well, the £9.95 HKSA suffers very badly from images and spurii so transmissions appear at more than one spot on the dial giving the impression of lots of activity. Also, with a scanner it is essential to know the exact frequencies and scan them.

2. **"In the search mode the scan occasionally stops on a signal but there is no sound present."** This could be due to two causes, either you are trying to receive an AM signal with the scanner in the FM mode or it is one of the "birdies" previously mentioned and which are unavoidable. Fortunately the AR900UK is well above average in this respect.

3. **" When I try and programme a certain frequency, the readout is 2kHz out."** Yes, the thing to consider is the incremental steps for the band in question - anything above 220MHz has a 12.5kHz increment and so any frequency which falls between two 12.5kHz step cannot be programmed exactly. In fact this is of negligible importance because anything which does not fall into the U.K. frequency allocations is going to be something oddball like a satellite. Either you will have a suitable aerial to receive it, in which case the bandwidth of the AR900UK is sufficient for any voice transmissions, or you won't in which case the problem is academic.

4. **"There is a gap between 280 and 300MHz in the middle of the Military air band and between 380 and 400MHz at the top end - is there any way I can programme frequencies in these gaps?"** Try it - although not guaranteed, I wouldn't mind betting it works, although I doubt very much indeed that there will be any activity at all between 380 and 400MHz.To be correct, the Military airband starts at 195MHz, but there does not appear to be any activity at

the present time below 225MHz, or above 375MHz.

5. **"I have heard a controller request an aircraft captain to continue with London on 134.22 but when I try to enter this frequency 134.218 comes up in the diaplay and nothing is heard".** To understand why, you have to remember that the air band is in 25kHz channels, so the frequency steps are, for example, 122.025, 122.050, 122.075, 122.100, 122.125, 122.150, 122.175, 122.200, and so on. When the controller says "134.17", or "124.22", he is simply abbreviating, and what he actually means is "134.175", "124.225". He knows this, the aircraft captain knows this, but the AR900UK doesn't. It does its best, but when you enter 124.22 it simply goes to the nearest valid frequency. The answer is straightforward; when the controller says "134.22", all you have to do is enter the correct frequency which is of course 134.225.

6. **"With some services such as Volmet, although I enter the correct frequency it sounds off tune".** Quite correct. When there is a network of ground stations on the same nominal frequency transmitting the same message, for technical reasons some of the transmitters may be deliberately offset by up to 10kHz from the nominal frequency, and this is why the signal sounds "off tune", because it is.

This completes the operating procedures of the AR900UK and I trust that you will not have any problems, but if you have, the Dealer from whom you bought the AR900UK will be happy to help in any way he can.

BANDPLAN.

FREQUENCY	SERVICE
108 - 136	Civil Airband
136 - 139.5	Satellite
139.5 - 141	Gas, Electricity
141 - 141.9	Broadcast link
144 - 146	amateurs
146 - 148	Police, Gas, Electricity
153 -	radio paging
156 - 168	Marine
161 -	Radio Paging
163 - 165	Radio Message Handling
165 - 173	PMR,Taxis etc.
195 - 395	Military Airband
425 -	PMR
430 - 440	Amateurs
448 -	PMR
450 -	Police
850 - 865	Govt.Emergency Services
869 - 905	Cellular Radio
934 - 935	CB
935 - 942	Cellular Radio

Note that we recommend a search increment of 25kHz throughout with the exception of Cellular Radio when it should be 12.5kHz.

SPECIFICATION

Frequency Range:	108 - 136MHz; 12.5, 25kHz steps 137 - 174MHz; 5,10,25kHz steps 220 - 280MHz; 12.5,25kHz steps 300 - 380MHz; 12.5,25kHz steps 406 - 470MHz; 12.5,25kHz steps 830 - 950MHz; 12.5,25kHz steps
Sensitivity	0.5μV for 12dB SINAD at 156MHz FM mode.
Image Rejection	30dB at 120MHz; 11dB at 935MHz
Scan Rate	up to 15 channels/second
Memory	100 channels
1st IF	21.4/177 MHz
2nd IF	455kHz.

AOR Ltd

2-6-4 Misuji, Taito-ku, Tokyo 111-0055, Japan.
Tel: +81 3 3865 1695 Fax: +81 3 3865 1697
post@aorja.com www.aorja.com

AOR (UK) Ltd - AOR Manufacturing Ltd

4E East Mill, Bridgefoot, Belper, Derbys DE56 2UA, England
Tel: +44 1773 880788 Fax: +44 1773 880780
info@aor.co.uk www.demon.co.uk/aor

AOR USA, INC.

20665 S. Western Avenue, Suite # 112
Torrance, CA. 90501, USA
Tel: (310) 787 8615 Fax: (310) 787 8619
info@aorusa.com www.aorusa.com