AR-DV1

SDR Digital Voice Receiver

OPERATING MANUAL

AOR, LTD.

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1 INTRODUCTION

1-1 INTRODUCTION

Thank you for purchasing the AR-DV1 SDR Digital Voice Receiver.

AOR is pleased to present you with the AR-DV1, the FIRST software defined digital voice receiver to receive and decode virtually ALL popular digital modes such as MOTOTRBO™, DMR™, dPMR™, APCO P25, NXDN™, Icom D-Star™, Digital CR, Yaesu, Kenwood ®, and Alinco EJ-47U as well as conventional analog signals including AM, wide and narrow FM, upper and lower sideband and CW.

To ensure the best possible result, we strongly recommend that you read this manual and use it as a reference to familiarize yourself with the receiver. Every effort has been made to make this manual correct and up-to-date. Due to continuous improvements, we acknowledge that there may be some errors or omission anomalies.

1-1-1 MAIN FEATURES
- Wide frequency coverage: 100 kHz to 1.3 GHz (Cellular blocked for the US consumer version)
- Direct conversion (100 kHz ~ 18 MHz)
- PC controllable with Hyperterminal software by using our COMMAND LIST to be downloaded at http://aorja.com/receivers/ar-dv1.html.
- Multi-mode unit capable of receiving AM (Synchronous), USB, LSB, CW, NFM, P25 (APCO25), NXDN™, D-STAR ™, ALINCO EJ-47U, YAESU, DIGITAL CR, dPMR™, DMR, MOTOTRBO™, KENWOOD ®
- SD card interface
- Selectable IF filter bandwidths
- CTCSS and DCS selectable squelch functions
- Built-in voice-inversion descrambling (Not available for the US consumer version)
- AGC
- Auto-notch, noise reduction (NR)
- USB interface
- 3 VFO's, 2,000 alphanumeric memories

1-2   TAKING CARE OF YOUR RECEIVER

There are no internal operator adjustments needed. In the unlikely event service is required; please contact us for technical assistance.

Do not use or leave the receiver in direct sunlight. It is best to avoid locations where excessive heat, humidity, dust, and vibrations are present. Always keep the AR-DV1 free from dust and moisture. Use a soft, dry cloth to gently wipe the external surfaces clean; never use abrasive cleaners or organic solvents which may damage certain parts.

Treat the AR-DV1 with care; avoid spilling liquids into the receiver and the associated power supply. Special care should be taken to avoid liquids from entering the area around the controls and through the speaker grill or via the connection jacks.

The AR-DV1 is designed to operate from a good quality regulated DC power supply of 10.8 to 16.0 V, which should be capable of supplying 1 A. Never connect the AR-DV1 directly to an AC power outlet.

The polarity of the DC input jack is clearly marked (center positive); the chassis of the receiver is at negative ground.

> **SAFETY NOTICE – Always disconnect the power supply from the AC outlet when the receiver is not in use for a long period of time. If used mobile, note that the AR-DV1 has NOT been manufactured or tested to meet any specific mobile safety requirements. The AR-DV1 has no user adjustable internal parts.**

When using the AR-DV1 as a base station, the best short wave reception is usually achieved through the use of a separate external earth (or ground) rod. However, consider the implications carefully if your AC building supply uses a Protective Multiple Earth (PME) system. If in doubt, consult a qualified electrician. Never earth (ground) to a gas pipe! The antenna connector of the AR-DV1 is intended for connection to a 50 Ohm (unbalanced) coaxial fed antenna such as a discone, dipole, Yagi, etc.

Avoid power cables when installing an antenna.

Operating anomalies

Should the AR-DV1 appear to behave strangely, normal operations may be easily achieved by performing the following steps:

> **Symptom**: No control of the receiver or the display appears to be frozen
> **Action**: Turn off the power switch on the front panel. Leave it off for approximately 10 seconds. Turn the power switch back on again. Normal operation should be restored.

Should the receiver still behave strangely, try a RESET as explained in chapter 11-5.

1-3 INCLUDED IN THE PACKAGE

The following items are provided in this package:

- 1   AR-DV1 receiver
- 1   AC power adapter
- 1   Operating Manual (this booklet)
- 1   Telescopic antenna
- 1   SDHC memory card

<u>Terminology</u>

Search & Scan

If this is your first time using a wide band receiver or you are not familiar with the terminology used, it is very important to understand the difference between **SEARCH** and **SCAN** modes.

SEARCH: The AR-DV1 provides several operations where transmissions (active frequencies) may be automatically located by sweeping the receiver over a wide frequency range, either from the currently displayed frequency traveling upwards (or downwards) in a specified tuning increment (step) or by sweeping over-and-over between two specified frequency limits. This process is known as **SEARCHING**. As the name implies, this process can take a long time to find transmissions due to their "often intermittent" and brief nature. For this reason, it is best to slice large frequency ranges into smaller, more manageable pieces where they may be intensely monitored.

When examining large frequency segments, it is common to find that 90% of the frequencies are inactive and only a small number of the remaining constitute what you really want. Searching still remains the best way to initially locate active and interesting transmissions (in conjunction with a good frequency listing and band plan).

SCAN: Once active transmissions have been identified (either by searching or by using a good frequency guide), it is more efficient to store the data into memories which can be rapidly and automatically monitored in succession, stopping when activity is encountered. This is a much more efficient means of monitoring the most wanted frequencies as you have targeted 100% of what you most want to hear. By contrast, searching is very inefficient for day-to-day monitoring.

Note: For the search & scan functions to operate properly, it is very important to advance the squelch to cancel background noise. This is because the AR-DV1 believes that it has found an active frequency when the squelch opens and the "BUSY" indicator lights up. Advance the squelch control clockwise until the background noise is just cancelled; this is known as the "threshold" position. If the squelch control is advanced too far, weaker signals may be missed.

Receive Mode / Additional Features

FM

- Built-in DCS (Digital Coded Squelch)

- Built-in CTCSS (Continuous Tone Coded Squelch System)
- Built-in Voice Inversion Descrambler (Not available on US consumer version) 2000~7000Hz
- Digital decoding (NXDN™, D-STAR™, ALINCO-EJ-47U, YAESU, DIGITAL CR, dPMR™, DMR, MOTOTRBO™, KENWOOD®) with automatic detection.

AM (Amplitude Modulation)
- Synchronous Detection
     SSB (Single Side Band) SAH/SAL (Upper Side Band/Lower Side Band) selectable synchronous
- AGC (Automatic Gain Control) mode / manual RF gain mode

SSB (Single Side Band)
- USB/LSB selectable
- AGC mode / manual RF gain mode

CW (Continuous Wave)
- Built-in narrow band IF filter 200 Hz/500 Hz

NR (Noise Reduction)
- Operates in AM, SSB modes

Auto Notch Filter
- Automatically attenuates beat tones and tuning signals.

Selectable Squelch mode
- NSQ (Noise Squelch), LSQ (Level Squelch) and VSQ (Voice squelch) can be selected.

DVR (Digital Voice Recorder)
- Received audio can be recorded on a SD memory card in WAV format.

2 CONTROLS AND FUNCTIONS

2-1 FRONT PANEL
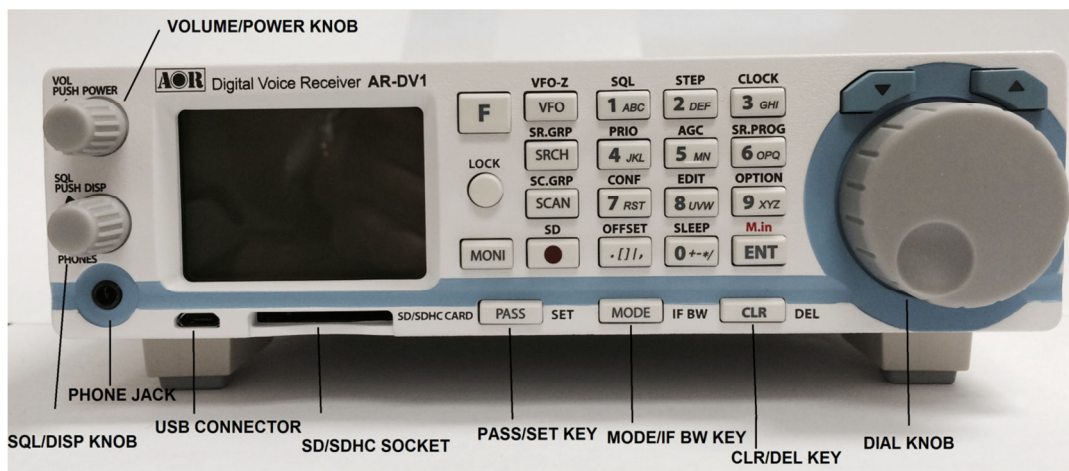
VOL/POWER KNOB

When power is connected to the receiver, the backlit LCD display changes to show the clock function on the screen. (Fig. 1-A)
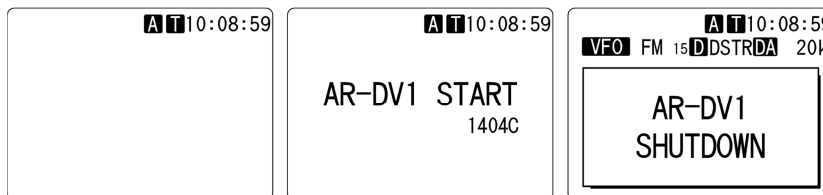
Fig. 1-A (Standby)   Fig. 1-B Power on   Fig. 1-C Power off

To turn on the receiver, push the volume knob. The start screen will appear on the display. (Fig. 1-B) Wait about eight seconds for the main screen to appear before beginning operation.

To turn off the receiver, push the volume knob until the shutdown screen appears on the display. (Fig. 1-C)

To change the volume level, turn the knob clockwise to increase, and counterclockwise to decrease. The volume level bar will be indicated on the screen.
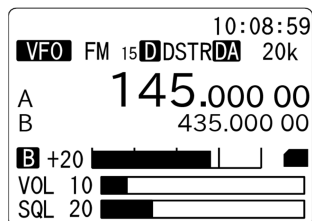
SQL/DISP KNOB

Rotate this knob to adjust the desired squelch level. Rotate clockwise until background noise goes off.

The squelch level will be displayed on the screen according to the rotation of the squelch knob.

```
                        10:08:59
 VFO  FM 15 D DSTR DA  20k
A        145.000 00
B            435.000 00
 B +20 ████    I  I    ■
VOL 10 ██████
SQL 20 ████
```
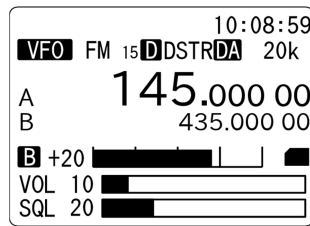
When the knob is pressed, current squelch level will be displayed for 2 seconds.

Push this knob for two seconds to view the squelch select menu, which will appear on the lower left of the display. The default setting is [AUTO]. Rotate the dial knob to select [AUTO], [LSQ], [NSQ].

(Note: LSQ: Level squelch, NSQ: Noise squelch)

To confirm selection, press the SQL knob.

PHONE JACK

Use a headphone with a 3.5mm plug. When a headphone is connected, the internal speaker will be disabled.

LCD
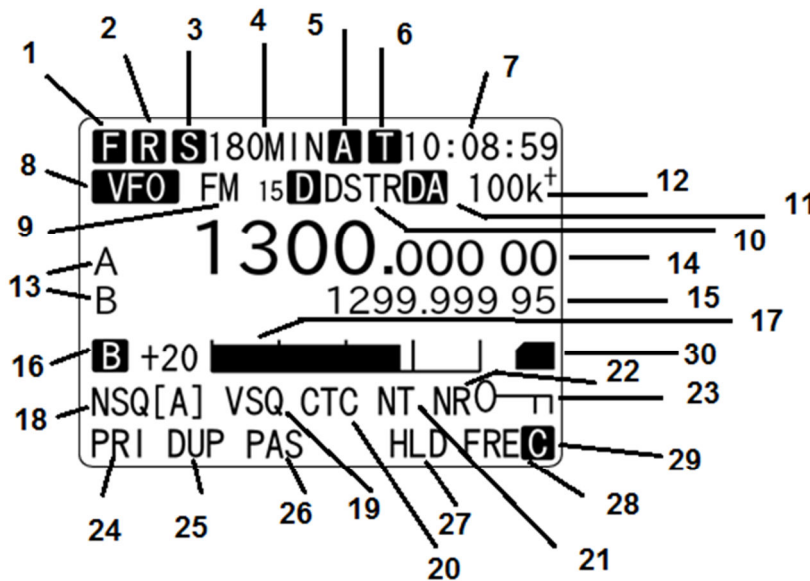
1 (F)   Function switch

2 (R), (P)   (R) Recording   (P) Playback

3 (S)   Sleep timer

4 ***MIN   Sleep timer (in minutes)

5 (A)   Alarm function. Will blink while activated

6 (T)   Recording timer. Will blink when recording timer is activated

(Note: The backlit LCD will go off while activated.)

7 HH:MM:SS   Clock

8 VFO   VFO mode (VFO search, Program search, Memory read, Memory scan)

9 FM xx   Receive mode: FM AM SAH SAL USB LSB CW

                       xx: IF BW (bandwidth)

                       FM: 200   100   30   15   6 (kHz)

                       AM: 15 8   5.5   3.8 (kHz)

                       SAH, SAL: 5.5   3.8 (kHz)

                       USB,LSB : 2.6 1.8 (kHz)

                       CW: 500   200 (Hz)

   (Note: The IF-BW settings are available only in the analog modes. In the digital mode, the IF-BW is

   automatically selected.)

10 Dxxxx   Digital decode mode

                      In digital auto decode mode, xxxx indicates decoded mode.

                      In digital manual mode, xxxx indicates selected mode.

xxxx	Decode mode
ALIN	Alinco EJ-47U digital
P-25	APCO P-25 Phase 1
dPMR	dPMR
D-CR	Digital CR / NXDN
DMR	DMR
YAES	YAESU digital
DSTR	Icom D-STAR

11 DA   Digital auto decode mode

12 xxx+   Frequency step   "+": Step adjust activated

13 A, B   VFO-A or VFO-B

14 xxxx.xxx xx   VFO-A frequency in MHz.

15 xxxx.xxx xx   VFO-B frequency in MHz.

16 B   "Busy" (Squelch opens)

17 +20 ▮▮▮▮▮▮▮▮ | | | "S-meter" Relative signal strength

18 xxx(x)   Squelch settings

                              NSQ (A) : Noise squelch in auto mode

                              NSQ: Noise squelch

                              LSQ (A) : Level squelch in auto mode

                              LSQ: Level squelch

19 VSQ   VSQ (Voice Squelch)

20 CTC   In FM mode (IF-BW less than 30 kHz)

                              CTC (CTCSS: Continuous Tone Code Squelch System)

                              RTN (Reverse CTCSS)

                              DCS (Digital Code System)

VI (Voice inversion) --- not available for USA consumer version

In AM, SAH, SAL, USB, LSB, CW modes

AGCF --- AGC speed fast

AGCM --- AGC speed medium

AGCS --- AGC speed slow

In auto mode, LSQ is selected for all AM modes and NSQ is selected for all FM modes.

RF-G ---- Receiver's manual gain control by the squelch knob.

21 NT   Auto Notch

22 NR   Noise reduction (in AM modes)

23 0⌐┐   Key lock

24 PRI   Priority receive

25 DUP   Frequency offset

26 PAS   In VFO search mode, pass frequencies stored.

In program search mode, pass frequencies are stored in the current search bank.

In memory read mode, current receive frequency are set to pass channel.

27 HLD   Delay time set to "HOLD" in VFO search mode, program search mode, memory

scan mode.

28 FRE   Free time set to other than "OFF" in VFO search mode, program search mode,

memory scan mode.

29 C   PC remote control mode

30 ■   SD card inserted in the slot and recognized

(Note: Attenuator function is always activated automatically and no attenuator indicator is displayed on the LCD screen. The s-meter indicates reflecting attenuation level.)

FRONT PANEL KEYS

[F]   The [F] (function) key is used to select secondary functions on the keypad.   When pressed, "F" in reverse contrast appears on the top left corner of the LCD. The first function of the keys are printed on their surfaces; the secondary functions are printed in black directly above the corresponding key. To cancel the "F", press this key again.

LOCK	Press and hold this key for two seconds to activate the key lock function. While activated, all front panel keys are disabled to prevent accidental misoperation of the receiver. However, volume and squelch controls remain operative. To cancel, press and hold this key again for two seconds.
MONI	Press and hold this key to force open squelch. When frequency offset is activated, pressing this key will display the offset frequency.
VFO	In VFO mode, pressing this key will toggle between VFO-A and VFO-B. Press and hold this key for two seconds to activate VFO search. In other modes, press this key to return to VFO mode.
SRCH	In program mode, press this key to copy the current frequency to VFO-Z and continue receiving in VFO-Z.
SCAN	Initiate scan in the memory read mode. While in scan mode, press this key to copy the current frequency to VFO-Z and continue receiving in VFO-Z. In other modes, press this key to return to VFO mode.
🔴	Start / Stop recording
[1]	Figure ONE for the numeric input of frequencies, bank, channel numbers, etc.
[2]	Figure TWO for the numeric input of frequencies, bank, channel numbers, etc.
[3]	Figure THREE for the numeric input of frequencies, bank, channel numbers, etc.
[4]	Figure FOUR for the numeric input of frequencies, bank, channel numbers, etc.
[5]	Figure FIVE for the numeric input of frequencies, bank, channel numbers, etc.
[6]	Figure SIX for the numeric input of frequencies, bank, channel numbers, etc.
[7]	Figure SEVEN for the numeric input of frequencies, bank, channel numbers, etc.
[8]	Figure EIGHT for the numeric input of frequencies, bank, channel numbers, etc.
[9]	Figure NINE for the numeric input of frequencies, bank, channel numbers, etc.
[0]	Figure ZERO for the numeric input of frequencies, bank, channel numbers, etc.
[ENT]	Confirm entry in most menus. In VFO mode, press this key to go to VFO-Z. In VFO search or program search mode, press this key to transfer the detected signal or stopped frequency to VFO-Z. The operation will be invalid while search is in progress. In memory read mode, press this key to transfer the current frequency to VFO-Z. In memory scan mode, press this key to transfer the detected signal or stopped frequency to VFO-Z. The operation will be invalid while scan is in progress.
[PASS]	This key is used to pass (skip over) unwanted active frequencies in VFO search mode and program search mode. In memory search mode, this key is used to switch on/off pass channel.
[MODE]	This key is to select the desired receive mode. Press this key to access the receive mode menu. Rotate the dial knob to select the desired mode. To accept the selection, press the [ENT] key.

Holding this key for two seconds will signal the receiver to go into digital auto mode.

[CLR]   This key is used to cancel frequency entry during programming or exit from a menu.

▼   In VFO search mode or program search mode, pressing this key will change frequency upward or change search direction.

In memory mode, pressing this key will move to next channel.

In memory scan mode, pressing this key will change the scan direction or resume scan.

▲   In VFO search mode or program search mode, pressing this key will change frequency downward or change search direction.

In memory mode, pressing this key will move to next channel.

In memory scan mode, pressing this key will change the scan direction or resume scan.

SECONDARY FUNCTIONS

Key	Press the [F], then press this key.	Press and hold the [F] key for two seconds, then press this key
VFO	Move to VFO-A	Set VFO
SRCH	Set search group	N/A
SCAN	Set scan group	Set memory bank
●	Configure SD card	N/A
1	Configure tone/code squelch	Set voice squelch
2	Set frequency step	N/A
3	Set clock	N/A
4	Priority on/off	Set priority
5	Set AGC (AM only)	N/A
6	Set search bank	N/A
7	Configuration menu	N/A
8	Data editor	N/A
9	Set option	N/A
0	Set sleep timer	N/A
.	Set offset	N/A
ENT	N/A	N/A
PASS	Set pass frequency	Deselect pass frequency
MODE	Set IF BW (Analog)	N/A
CLR	Cancel entry	N/A
▲	Frequency can be changed upward in 10 incremental steps	N/A
▼	Frequency can be changed downward in 10 incremental steps	N/A

2-2 REAR PANEL
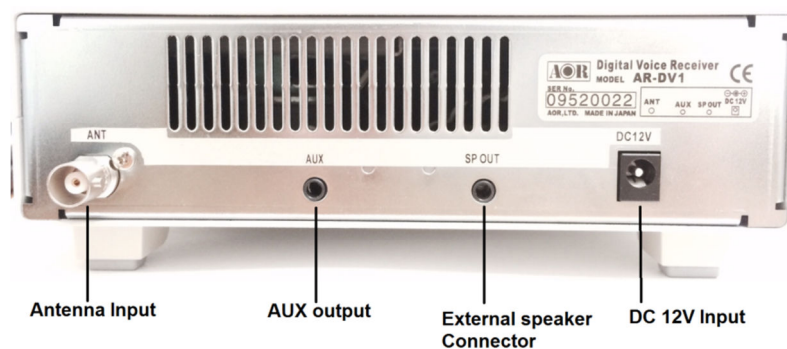
1. Antenna input

   This input can be used to connect either the supplied telescopic antenna or an external antenna.

   When an external antenna is used, select one with 50 Ohms of impedance, unbalanced.

2. AUX output

   3.5mm mono jack. The discriminator output (in FM mode only, 6kHz and 15kHz bandwidth) is 600 Ohm nominal, -20dBm output.

3. External speaker connector

   3.5mm mono jack. When an external speaker is used, the internal speaker will be disabled.

4. DC 12V input

   Connect the supplied AC adapter to this connector. When using your own power supply, select one with 12V DC, 1 A. capacity. To minimize noise getting into the receiver, please avoid using any switching type power supply.

3   GETTING STARTED

3-1   MAKING THE AR-DV1 READY FOR OPERATION

3-1-1   CONNECT THE ANTENNA

For reception on all bands, connect the antenna to the antenna connector on the rear panel
of the AR-DV1.

3-1-2   CONNECT POWER

Connect the power to the DC power jack on the rear panel of the AR-DV1.

The supplied AC power adapter or a regulated DC power supply (10.7 ~ 16.0 V with capacity 1A) may be
used. Do not connect to a 24 V system.

The clock will be displayed on the LCD.

(*Note: To use the clock function, a power adapter must be always connected and power supplied to
the AR-DV1.*)

3-2   SWITCHING ON FOR THE FIRST TIME

Press the volume knob on the front panel of the AR-DV1. This is the power switch.
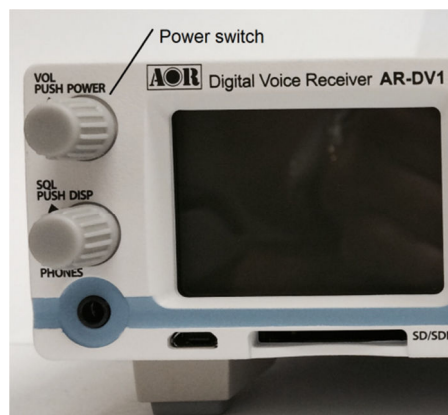
As you push the volume knob, a 'click' will be heard.

Please be careful NOT to switch on the receiver with an earphone connected because there may be an
audible click when the unit is switched on and the volume may be accidentally set too high.

Opening screen

(Note: The firmware version number may vary.)

After the opening screen appears on the LCD, the main screen will then be displayed.

It will take approximately eight seconds before the main screen appears. This is a normal process to initialize the AR-DV1.

To power off the AR-DV1, push and hold the power switch on the front panel for about two seconds. After the "AR-DV1 SHUTDOWN" message is displayed, the receiver will automatically power off.
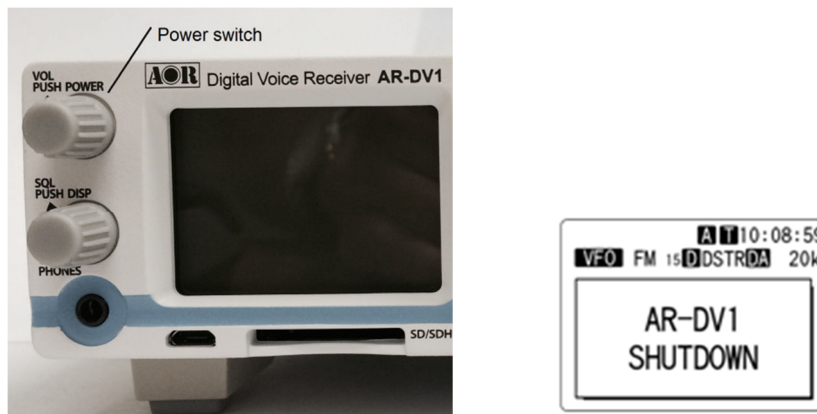
3-3 VOLUME CONTROL

To change the volume (audio) level, rotate the volume control knob clockwise to increase, and counterclockwise to decrease. The audio level bar will be indicated on the LCD.
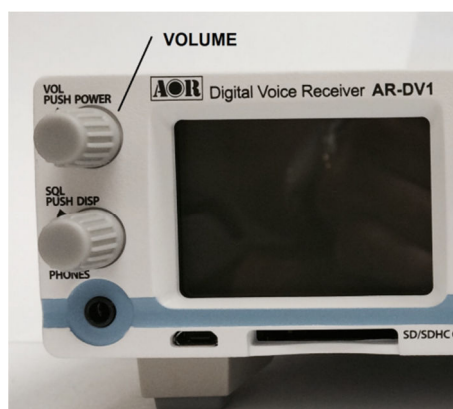
3-4 SQUELCH CONTROL

To change the squelch level, rotate the squelch control knob clockwise to increase, and counterclockwise to decrease. The squelch level will be indicated on the LCD.
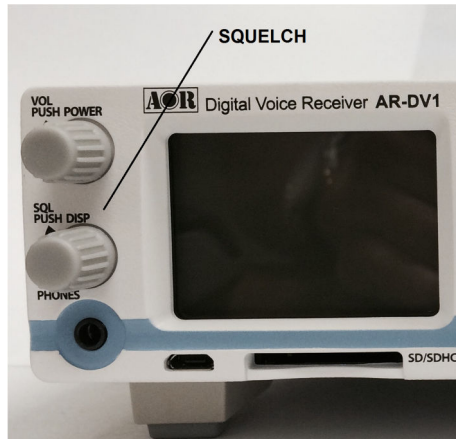
After setting the squelch level, the LCD will return to its original display.

While squelch opens, "B" (busy) will appear in reverse contrast on the middle left of the LCD.

3-5 VFO SELECTION

The AR-DV1 has three (3) VFOs identified as "VFO-A", "VFO-B" and "VFO-Z" on the middle left of the LCD.

The term VFO means *'Variable Frequency Oscillator'*, which today refers to a tunable data storage which contains frequency, step, step-adjust, attenuator etc. Pressing the [VFO] key each time will toggle between VFO-A and VFO-B. Note VFO-Z will be used for a different purpose.
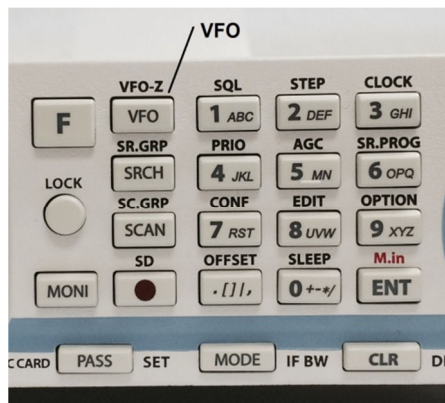
(VFO screen)

(VFO screen with frequency database)

(VFO-Z always displays frequency database)

3-5-1 TUNING FREQUENCY

3-5-1-1 ENTERING A FREQUENCY USING THE NUMERIC KEYPAD

While in VFO mode, enter the required frequency using MHz format followed by the [ENT] key.

(Example) Frequency entry of 81.3 MHz

Press the [8] key. Press the [1] key. Press the [.] key. Press the [3] key. Press the [ENT] key.
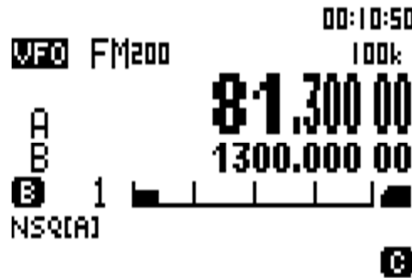
(Example) Frequency entry of 1.134 MHz (1134 kHz)

Press the [1] key. Press the [.] key. Press the [1] key. Press the [3] key. Press the [4] key. Press the [ENT] key.
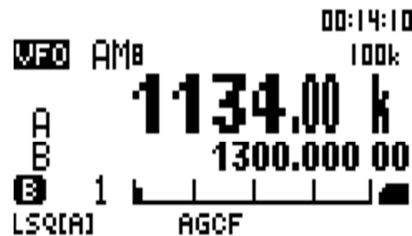
Correcting frequency input

Press the [CLR] key to delete the entry from the right hand side.

3-5-1-2 CHANGING FREQUENCY USING THE MAIN DIAL

In VFO mode, the active VFO frequency may be 'tuned' in by using the tuning dial mounted on the right side of the front panel. Rotate the dial 'clockwise' to increase the frequency or 'counterclockwise' to decrease the frequency.

3-5-1-3 CHANGING FREQUENCY USING [UP] KEY OR [DOWN] KEY

The [▼] key and [▲] key provide a convenient way to change the frequency.

The step size at which the frequency is incremented or decremented is the same than when frequency is changed with the main dial.

Press the [▲] key to tune the receiver upward in the step size selected, and use the [▼] key to tune the receiver downward in frequency.

3-5-1-4 VFO COPY

In VFO mode, press the [F] key and then the [PASS] key to copy the frequency from one VFO to another.

```
VFO COPY                1/1

VFO-Z  ➡  VFO-B

Cancel[CLR] SET[ENT]
```
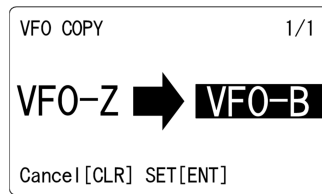
(While receiving frequency on VFO-Z, copy it to VFO-B)

To confirm selection, press the [ENT] key.

3-6 RECEIVE MODE

Due to the necessities of signal bandwidth, channel occupancy, and transmission efficiency, different receive modes are used by various services. The tuning step and receive mode are allocated by departments of governments following international discussions so they are not consistent throughout the world. For this reason, it may be necessary to change receive mode to monitor various transmissions.

AM – Amplitude Modulation
   Used by broadcast services throughout the world on long-, medium-, and shortwave frequencies,
   AM is also used by VHF airband, and UHF military airband.

   SAM – Synchronous AM
      Helps to listen to SW (Shortwave) AM broadcast stations with fading signals. The selection
      between SAH (higher side band) a SAL (lower side band) allows to choose the side band with the
      least noise.

FM – There are two common types of FM (Frequency Modulation):

   NFM – Narrow Band Frequency Modulation
   Provides high quality communication for relatively short distance operations.
   FM uses a greater frequency bandwidth than other modes.

   NFM is the most common mode used above 30 MHz with the exception of the airbands. NFM is
   widely used on the VHF bands: VHF marine band, 2m amateur band, 70 cm amateur band, PMR
   (Private Mobile Radio) and utilities.

   In the absence of a signal, the background white noise may appear quite loud. For easier listening,
   the squelch control should be rotated clockwise until the background noise disappears; this should
   be carried out while no signal is present. The point at which the background noise is cancelled is
   known as the *threshold point*. Do not advance the squelch control more than necessary or the
   receiver will appear to be desensitized and weaker signals will be missed.

WFM – Wide Band Frequency Modulation

Used by VHF and UHF broadcast stations because of its excellent audio quality, this is available due to the relatively wide frequency bandwidth employed.

Used only for local services such as VHF band stereo channels.

LSB – Lower Side Band / A form of SSB (Single Side Band).

Not intended for commercial use but used extensively by Radio Amateurs on frequencies below 10 MHz. This assists in the separation of Commercial and Amateur users on traditionally shared bands and prevents them from speaking to each other.

SSB is a very efficient method of transmission as the unwanted second sideband and carrier have been removed. This allows the full transmitter power to be employed in carrying useful information within the wanted sideband. As a result, greater distances are possible on SSB and a smaller frequency bandwidth is required than with most other modes.

USB – Upper Side Band

The same comments apply as for LSB. By convention, Radio Amateurs also use USB above 10 MHz.

CW - Continuous Wave

Also referred as Carrier Wave or Morse Code.

Commonly used on the shortwave bands by Radio Amateurs toward the lower end of each band allocation. Some commercial use is still made by shipping etc. although its use is being phased out due to the introduction of automated stations.

3-6-1   DIGITAL AUTO MODE

When in auto mode, receive mode is set to FM and the receiver will automatically detect and decode digital voice transmissions.

(For a worldwide directory of D-STAR repeater frequencies (classified by country and city), you may want to check the very informative D-Star Repeater Directory site at: http://dstarusers.org/repeaters.php)

To activate auto mode, press the [MODE] key and rotate the dial knob to select "AUTO" in the reverse contrast on the bottom of the LCD.

Alternatively, just long press the [MODE] key.
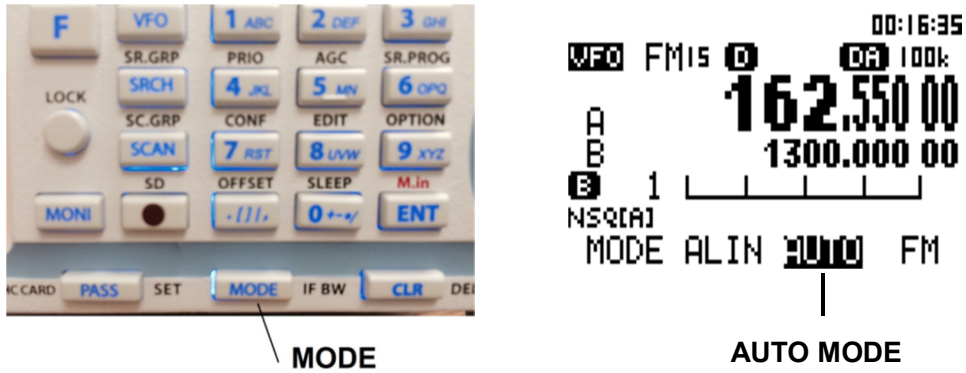
MODE   AUTO MODE

Note: Auto-mode is cancelled as soon as the receive mode is changed.

3-6-2   RECEIVE MODE SELECTION

Any receive mode may be selected at any frequency within the receiver's frequency coverage.

To access the receive mode menu, press the [MODE] key.
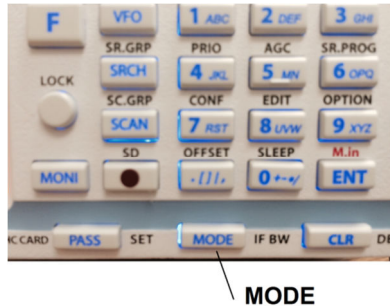
MODE

The following modes are available:

> AUTO, FM, AM, SAH, SAL, USB, LSB, CW, DSTR, YAES, DMR, D-CR, dPMR, P-25, ALINC.

AUTO mode   AM mode   DMR mode
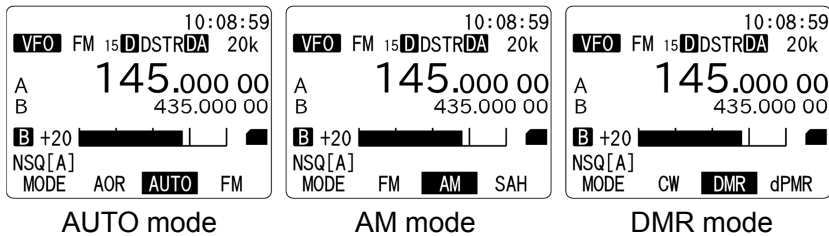
Rotate the dial knob to select the desired receive mode.

Press the [ENT] key to confirm selection.

> Note that whichever mode is selected, the default IF filter bandwidth is applied.

3-6-3   DIGITAL DATA DISPLAY

When DIG.DECODE setting in the option menu (refer to: Section 10-4) is set to ON, data information for the received signal will be displayed on the bottom of the LCD.
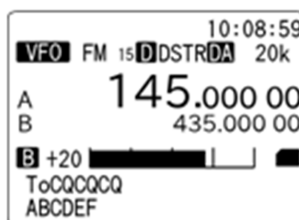
3-7   CHANGING THE FREQUENCY STEP

The specification for channel occupancy, step (separation) and mode are decided by and allocated by the Departments of Governments following international discussions.

The allocation of frequency bands are not the same all over the world and channel separation (step) varies from band to band. As an example, the channel separation (step) for the MW (medium wave) band in the U.S.A. is 10 kHz, and is 9 kHz in Europe and Japan.
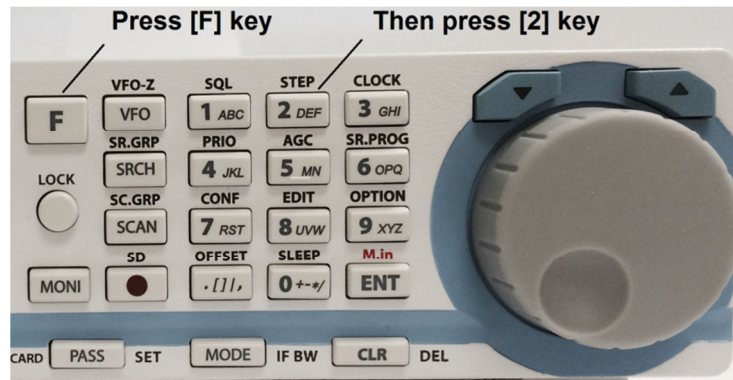
If you wish to change the default tuning frequency step, press the [F] key and then the [2] key. The LCD will display the current frequency step in reverse contrast. Rotate the dial knob to select the desired step.

You have the choice between 10Hz, 50Hz, 100Hz, 500Hz, 1kHz, 2kHz, 5kHz, 6.25kHz, 7.5kHz, 8.33kHz, 9kHz, 10kHz, 12.5kHz, 15kHz, 20kHz, 25kHz, 30kHz, 50kHz, 100kHz, 500kHz.

To validate the displayed tuning step size, press the [ENT] key.

3-8   IF BANDWIDTH

The IF bandwidth determines how SELECTIVE the receiver will be when monitoring signals off air. However, it is not simply a case of using the narrowest filter at all times; particular modes require differing amounts of bandwidth in order to operate. Otherwise the receive system will not produce intelligible sound. Correct receive mode and IF bandwidth must always be selected for optimum reception. If the bandwidth selection is too narrow, distortion or signal break-up may occur. If the bandwidth selection is too wide, adjacent interference may be encountered. For this reason, a selection of IF filter bandwidths are provided as standard.

Typical examples of receive mode and IF bandwidth are:

  200 kHz – VHF FM broadcast
  30 kHz, 100 kHz – Wireless microphone, etc. (30 kHz for satellite FAX, too)
  15 kHz – PMR, amateur band, etc. FM 6 kHz may also be used
  6 kHz – VHF/UHF airband, short wave broadcast, medium & long wave, PMR, etc.

3 kHz – Short wave amateur band, short wave utility such as oceanic airband etc.

500 Hz – Morse code used by radio amateurs and some marine traffic on short wave

An appropriate IF filter is automatically selected when auto mode is selected. However any combination of IF filter and receive mode is possible in the manual mode. When you have manually selected an IF filter bandwidth, auto mode will be cancelled, but the receive mode, frequency step, etc will be retained until they are changed manually.

3-8-1 MANUALLY SELECTING IF BANDWIDTH

Press the [F] key and then the [MODE] key.
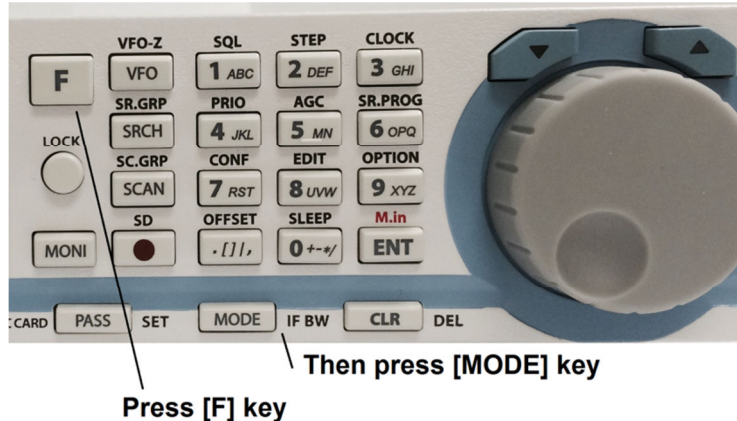
Select a new bandwidth from the list by rotating the dial knob. To accept the new bandwidth selection, press the [ENT] key.
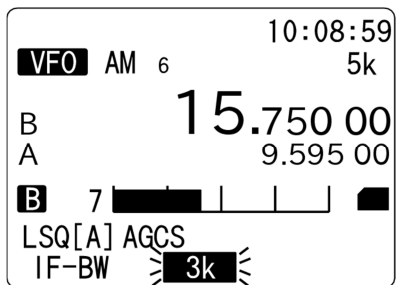
Mode	Selectable band width (kHz)	Default (kHz)
FM	200, 100, 30, 15, 6	15
AM	15, 8, 5.5, 3.8	8
SAH, SAL	5.5, 3.8	5.5
USB, LSB	2.6, 1.8	2.6
CW	0.5, 0.2	0.5

Selectable band width

Note: The IF bandwidth will be selected automatically in digital mode.

4 ADDITIONAL SETTINGS

4-1 AGC (AUTOMATIC GAIN CONTROL)

AGC is available in the following AM modes: AM, SAH, SAL, USB, LSB and CW

To change the AGC parameter setting, press the [F] key and then the [5] key.

Press the [F] key Then press the [5] key
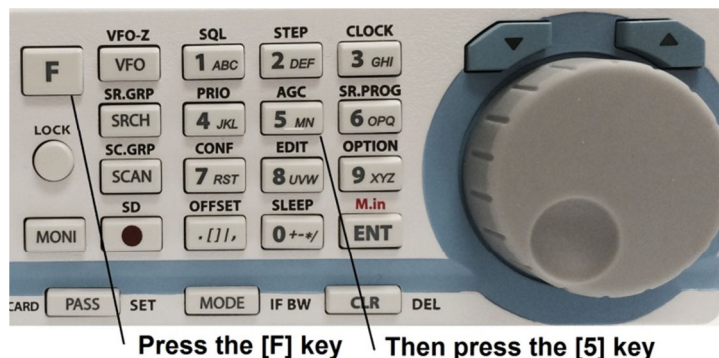
Select a new AGC parameter from the list of "AGCS (FAST)", "AGCM (MIDDLE)", "AGCS (SLOW)", by rotating the dial knob.
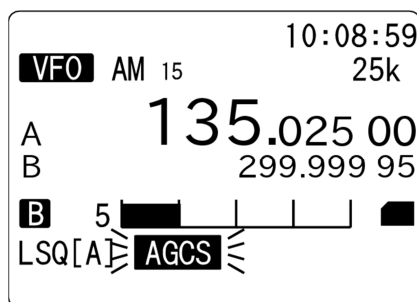
To accept the new AGC parameter, press the [ENT] key.

Usually, **FAST** is used to receive CW, **MEDIUM** for AM and FM, and **SLOW** for SSB mode.

However, this option cannot be configured in FM mode.

When AGC is set to RF-G, the RF gain control can be adjusted by the squelch knob.

4-2 ATTENUATOR

The attenuator reduces signal to the RF input stages of the AR-DV1. This helps prevent overloading due to connection to an external antenna or when the receiver is used close to strong transmissions.

The AR-DV1 has the automatic attenuator function.

4-3   RF GAIN

To activate the manual RF gain control, press the [F] key and then the [5] key.

Press the [F] key   **Then press the [5] key**
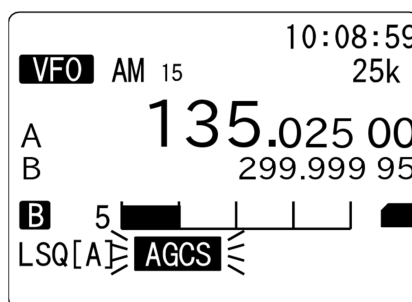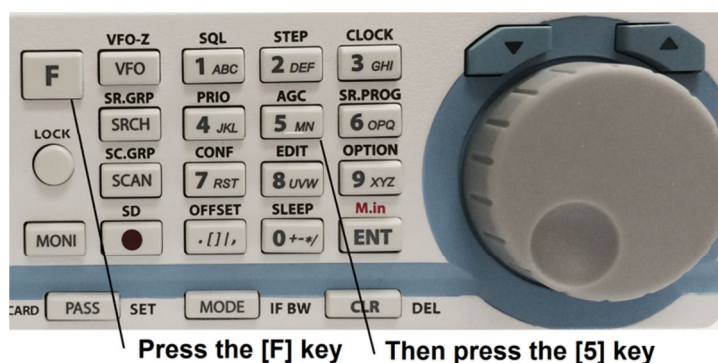
Rotate the dial knob to select "RF-G".

To change the RF gain manually, rotate the squelch knob. To cancel the manual RF gain control, repeat the steps above.

(Note: The manual RF gain control is not available while the receiver is in AGC mode.)

4-4   KEY LOCK

Press and hold the [LOCK] key to activate the key lock function.
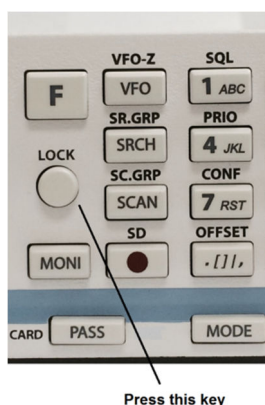
Press this key

While activated, all front panel keys are disabled to prevent accidental misoperation of the receiver. However, the volume and squelch controls remain operative.

To deactivate the key lock, press and hold the [LOCK] key.

4-5   VFO SETTING

To go to the VFO setting menu, press the [F] key. Then press and hold the [VFO] key for two seconds.
Following screen will appear.

```
┌─────────────────────────┐
│ VFO SEARCH        1/1   │
├─────────────────────────┤
│ DELAY             2.0   │
│ FREE              OFF   │
│ STORE             OFF   │
│ DEL.BK39         [OFF]  │
│                         │
├─────────────────────────┤
│ Cancel[CLR] SET[ENT]   │
└─────────────────────────┘
```

4-5-1   VFO SEARCH DELAY

The delay parameter affects the time the AR-DV1 will remain on an active frequency in VFO search
mode once the received signal has disappeared and the squelch is closed. This is particularly useful
for customizing how long the receiver will wait for a reply before continuing to search.

The parameter ranges are off, hold and 0.1 to 9.9 seconds in 0.1 second incremental steps.
(Default: 2.0 seconds)

To set the delay parameter, perform the following steps:
1. On the VFO search setting screen, use the [▼] key or [▲] key to select [DELAY].
2. Rotate the dial knob to select the delay time.
3. If "HOLD" is selected, the receiver will stop searching
4. To confirm entry, press the [ENT] key. To set other parameters, press the [▼] key.

4-5-2   VFO SEARCH FREE (PAUSE)

The search free (pause) parameter determines how long the receiver will remain on an active
frequency before resuming searching even if the signal is still busy. Search free helps keep you from
having to manually intervene to force the search to continue or use frequency lockout (pass).

The parameter ranges are off and 1 to 60 seconds. When the parameter is set to off, the receiver
remains on the busy frequency until the received signal disappears or the frequency is changed.

To set the parameter, perform the following steps:
1. In the VFO search screen, use the [▼] key or [▲] key to select [FREE].
2. Rotate the dial knob to set scan pause parameter (between 1 ~ 60 or off). To set search free to
     off (zero), press the [PASS] key or enter "0" from the numeric keypad.
3. To confirm entry, press the [ENT] key. To set other parameters, press the [▼] key.

4-5-3   VFO SEARCH STORE

This menu is to select ON or OFF to save received frequencies in VFO search mode onto memory
bank 39. (Default: OFF)

To set the parameter, perform the following steps:

1. In the VFO search screen, use the [▼] key or [▲] key to select [STORE].
2. Rotate the dial knob to select parameter ON or OFF.
3. To confirm entry, press the [ENT] key. To set other parameters, press the [▼] key.

4-5-4   DEL.BK39

This menu is to select ON or OFF to delete all data on memory bank 39 in VFO search mode.
(Default: OFF)

To set the parameter, perform the following steps:

1. In the VFO search screen, use the [▼] key or [▲] key to select [DEL.BK39].
2. Rotate the dial knob to select parameter ON or OFF.
3. To confirm entry, press the [ENT] key. To set other parameters, press the [▼] key.

4-6 NOISE SQUELCH AND LEVEL SQUELCH

```
                              10:08:59
 VFO  FM 15 D DSTR DA  20k
 A       145.000 00
 B             435.000 00
 B +20 ▐▬▬▬▬▬▬  I  ⌐  ▬
 NSQ[A]
```
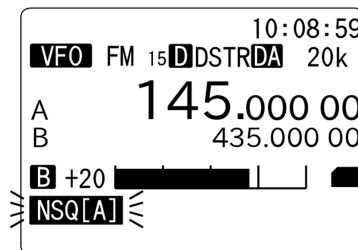
Press and hold the SQL knob for two seconds and squelch setting will be displayed.

NSQ (Noise Squelch): Available in FM mode

NSQ (A): Noise Squelch in auto mode

LSQ (Level Squelch): Level squelch

LSQ (A): Level Squelch in auto mode

Select the desired squelch type by rotating the dial knob.

Press the [ENT] key to confirm entry. Alternatively, press the [CLR] key to abort.

To set the squelch level, press the SQL knob and rotate the knob clockwise until background noise is cancelled.

4-7 VOICE SQUELCH

When the voice squelch function is activated, the audio will be muted on unwanted voice signals.

The squelch parameter ranges are OFF and 0 ~ 7. (Default: 4)

To set the voice squelch parameter, perform the following steps:

1. Press the [F] key. Then press and hold the [1] key for two seconds.
2. The voice squelch setting screen will appear.

```
┌─────────────────────────┐
│ VOICE SQL        1/1    │
│ VOICE SQL        OFF    │
│ DELAY            020    │
│ LEVEL              4    │
│                         │
│ ─────────────────────── │
│ Cancel[CLR] Set[ENT]   │
└─────────────────────────┘
```

3. Rotate the dial knob to select set voice squelch function OFF or ON. (Default: OFF)

4. To select OFF, press the [ENT] key. It will return to normal display.

5. If ON is selected, press the [▼] key to select "DELAY" parameter in reverse contrast.

6. The DELAY parameter is to set the delay time before activating voice squelch in 0.1 second increments.   (Default: 020 --- 2 seconds)

7. Press the [▼] key to select "LEVEL" parameter in reverse contrast.

8. Rotate the dial knob to set voice level parameter (between 1 ~ 7 or OFF). (Default: 4)

9. To confirm entry, press the [ENT] key. Alternatively, press the [CLR] key to cancel entry.

5 MANAGING A SD CARD

The AR-DV1 has a built-in SD memory card interface used for voice recording and/or memory management. To access the menu to manage the SD card, perform the following steps:

1. Insert a SD memory card with a printed label facing upward into the slot on the front panel until you hear a click.

2. Wait until " ▆ " icon appears on the right middle of the LCD.

```
VFO  FM 15 D DSTR DA  20k
A     145.000 00
B         435.000 00
B +20 ▆▆▆▆▆▆▆  |    | ▆  ←─  SD CARD
VOL 10 ▆▆▆▆▆▆▆▆▆▆▆▆▆▆▆▆     INSERTED
SQL 20 ▆▆▆▆▆▆▆▆▆▆
```

3. Press the [F] key and then the [●] (SD) key. The following screen will appear.

```
SD CARD          1/1
LIST          VIEW->
BACKUP         SET->
FREE:00535MB/31250MB


Cancel[CLR] Set[ENT]
```
(Example)
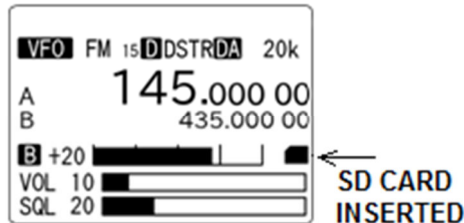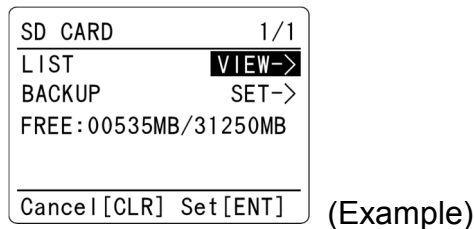
FREE: 00535MB/31250MB

000535MB --- Space free, 31250MB ----- Total size

(*Note: If the SD card is not properly inserted into the slot, above screen will not appear.*)

5-1 SD CARD INFORMATION

After performing above steps, press the [ENT] key while "VIEW->" is selected in reverse contrast.

While reading from the SD card, the following screen will appear.

```
SD CARD     PAGE[DIAL]


   SD READING...


Cancel[CLR]  SET[ENT]
```

The file list of the SD card will appear.

```
SD CARD          PAGE 001
[1]─→ 1404C.DV1     14/04/20 19:03
[2]─→ 00000001.WAV 14/04/23 09:42
[3]─→ SRCHBK.CSV    14/03/28 15:13
[4]─→ SCANGRP.CSV   14/03/28 15:14
Cancel[CLR]  SET[ENT]
```
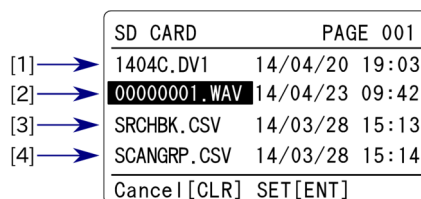
(1) Firmware version

(2) Recorded files

(3) Search bank data

(4) Scan group data

To exit the SD card configuration menu, press the [CLR] key.

5-2 BACKUP DATA TO A SD CARD

To backup memory channel, search bank contents, or receiver's configuration data of the AR-DV1 to a SD card, perform the following steps:

1. Insert a SD memory card with a printed label facing upward into the slot on the front panel until you hear a click.

2. Wait until "■" icon appears on the right middle of the LCD.

```
VFO  FM 15 D DSTR DA  20k
A        145.000 00
B          435.000 00
B +20 ■■■■■ | | ■  ←
VOL  10 ■■■■■■■■■■          SD CARD
SQL  20 ■■■■■                 INSERTED
```

3. Press the [F] key and then the [●] (SD) key. The following screen will appear.

```
SD CARD          1/1
LIST           VIEW->
BACKUP          SET->
FREE:00535MB/31250MB


Cancel[CLR] Set[ENT]
```
(Example)
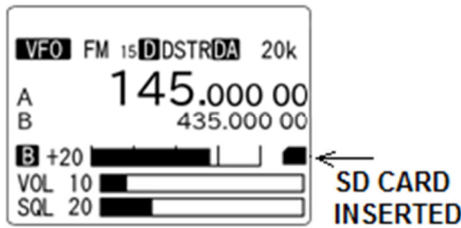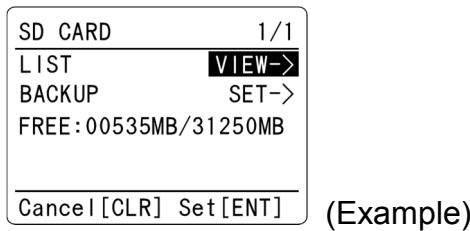
4. Press the [▼] key to move the cursor to [BACKUP] parameter in reverse contrast.

5. Press the [ENT] key while "SET->" is selected in reverse contrast.

6. The following backup menu will appear.

```
SD BACKUP       1/2   SD BACKUP       2/2

SRCH BANK     EXEC    SCAN GRP.     EXEC
SRCH GRP.     EXEC    SYSTEM        EXEC
MEM CH.       EXEC
MEM BANK      EXEC

Cancel[CLR] Set[ENT]  Cancel[CLR] Set[ENT]
```

SRCH BANK (Search Bank): Backup all search bank data ---   File name: SRCHBK.CSV

SRCH GRP (Search Bank Group): Backup all search bank group data

--- File name: SRCHGRP.CSV

MEM CH (Memory Channel): Backup memory channel data ---   File name: MEMCH.CSV

SCAN GRP (Scan Group): Backup all scan bank group data

--- File name: SCANGRP.CSV

SYSTEM: Backup Receiver's configuration data --- File name: SYSTEM.CSV

Select the category and press the [ENT] key to backup data.

5-3 RESTORE DATA FROM A SD CARD

1. Insert a new SD memory card with a printed label facing upward into the slot on the front panel until you hear a click.

2. Wait until "█" icon appears on the right middle of the LCD.

```
VFO FM 15 D DSTR DA  20k
A      145.000 00
B           435.000 00
B +20 ████████▌ │ █    ← SD CARD
VOL 10 ████                INSERTED
SQL 20 █████████
```

3. Press the [F] key and then the [●] (SD) key. The following screen will appear.

```
SD CARD          1/1
LIST          VIEW->
BACKUP         SET->
FREE:00535MB/31250MB


Cancel[CLR] Set[ENT]
```
(Example)
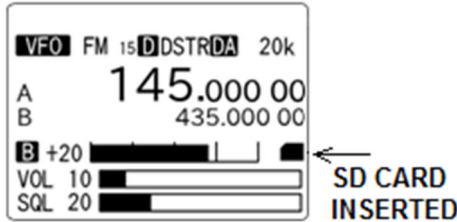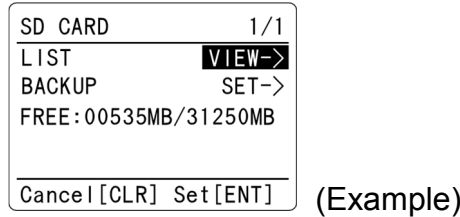
4. Press the [▼] key to move the cursor to [LIST] parameter in reverse contrast.

5. Press the [ENT] key.

6. The file list of the SD card will be displayed.

The file list of the SD card will appear.

(1) Firmware version

(2) Recorded files

(3) Search bank data

(4) Scan group data

```
SD CARD          PAGE 001
[1]→ 1404C.DV1    14/04/20 19:03
[2]→ 00000001.WAV 14/04/23 09:42
[3]→ SRCHBK.CSV   14/03/28 15:13
[4]→ SCANGRP.CSV  14/03/28 15:14
Cancel[CLR] SET[ENT]
```

7. Select the desired backup file to be restored

8. Press the [ENT] key. Restore will start.

When restoring either the entire amount of data or a specific selection of data, it may be easier to plan in advance and use a PC.

9. The prefix of file name can use any characters or numbers, however, the extension must be always ".csv". If there is an error of the file contents, an error message will be displayed and quit restoring.

```
SD CARD    PAGE[DIAL]

 RESTORE ERROR
 BAD CONTENTS

Cancel[CLR] Set[ENT]
```
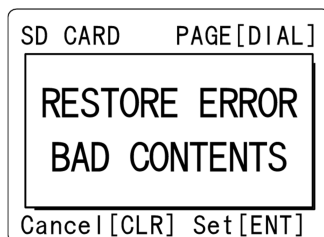
5-4   RECORDING AUDIO

To record audio of the AR-DV1 on the SD memory card, perform the following steps:

1. Insert a SD memory card with a printed label facing upward into the slot on the front panel until you hear a click.

2. Wait until "▉" icon appears on the right middle of the LCD.
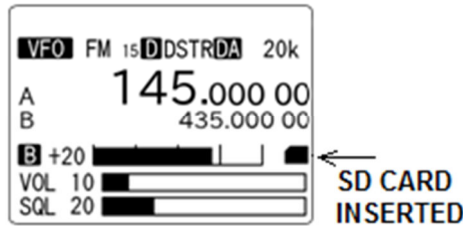
3. Press the [●] (SD) key. The [R] icon in reverse format will appear on the top left of the LCD.

4. To stop recording, press the [●] (SD) key again. The [R] icon will disappear.

The file name is composed of 8 digits, starting as "00000001.wav". The following recording will be named "00000002.wav", and so on.

If the file name already exists, it will be overwritten. You can record up to approx. 7 hours for 1 GB.

5-5   PLAYBACK AUDIO FROM A SD CARD

To playback recorded audio of the AR-DV1 on the SD memory card, perform the following steps:

1. Insert a SD memory card with a printed label facing upward into the slot on the front panel until you hear a click.

2. Wait until "▉" icon appears on the right middle of the LCD.
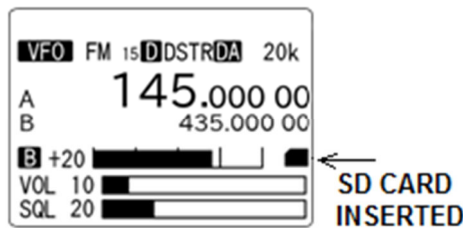
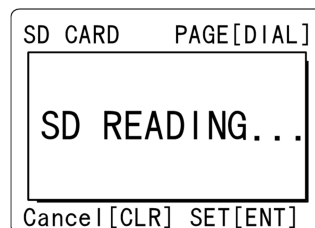3. Press the [F] key and then the [●] (SD) key. The following screen will appear.
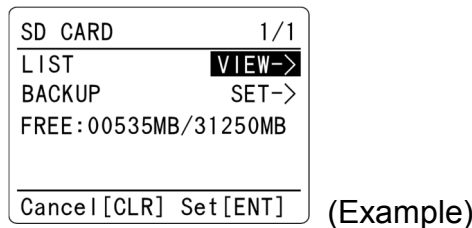
   (Example)

4. Press the [ENT] key while "VIEW->" is selected in reverse contrast.

While reading from the SD card, the following screen will appear.

```
SD CARD     PAGE[DIAL]
┌─────────────────────┐
│                     │
│  SD READING...      │
│                     │
│                     │
└─────────────────────┘
Cancel[CLR] SET[ENT]
```
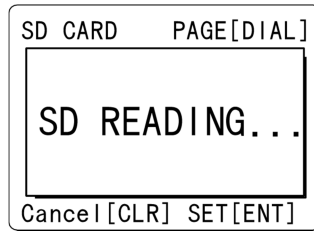
The file list of the SD card will appear.

(1) Firmware file

(2) Recorded files

(3) Search bank data

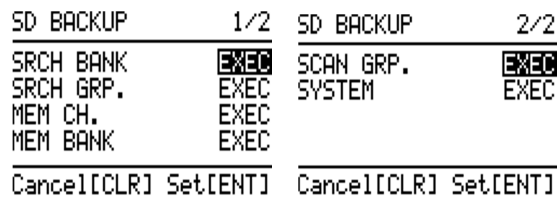(4) Scan group data

```
[1]──▶  SD CARD          PAGE 001
[2]──▶  1404C.DV1     14/04/20 19:03
[3]──▶  00000001.WAV 14/04/23 09:42
[4]──▶  SRCHBK.CSV    14/03/28 15:13
        SCANGRP.CSV   14/03/28 15:14
        Cancel[CLR] SET[ENT]
```

5. Using the [5. or [▼] key, select the recorded file (in wav format).

6. Press the [ENT] key. The audio file will play back.

```
┌─────────────────────────────┐
│ P                           │
│                             │
│         145.040 00          │
│00000001.WAV 14/03/23 14:13  │
│                        ◼    │
│   STOP[PRESS ANY KEY]       │
└─────────────────────────────┘
```
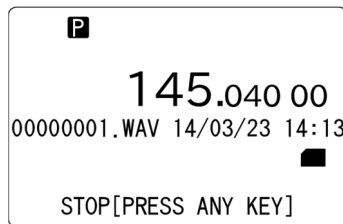
"P" in reverse contrast will appear on the top left of the LCD. To stop, press the [CLR] key.

When the playback is finished, "P" will disappear.

6 MEMORY CHANNELS AND BANKS

It is convenient to store commonly used frequencies into a memory channel along with mode etc., as this saves having to key the data in over and over again. Memory read is very straightforward and quick when compared to retyping all data.

6-1 MEMORY CHANNEL OVERVIEW

Think of memory channels as pages in a notebook each of which is numbered to identify it. Data may be written to each new page (memory channel) and each page may be overwritten with new data, so they can be used over and over again. The AR-DV1 has **2,000 memory channels** and one **priority channel**.

Each memory channel may hold:

- **One receive frequency**
- **Receive mode**
- **Tuning step**
- **Text comment of up to 12 characters**

The alphanumeric comment may be used to ease identification at a later date. The 2,000 memory channels are divided into 40 banks, and each bank has 50 channels. The memory banks are identified by the first **BANK** number 0, 1, 2, 3, …, 48, 49 and the individual channels are numbered from 00 to 49.

   (Example): "1234" is the location: memory bank "12" and memory channel "34"

The data contents of memory and search banks are held in an EEPROM so that no backup battery is required for memory retention.

The stored data may be quickly and easily recalled, changed or deleted using the memory recall and delete functions.

Note: When the receiver is switched OFF, all VFO data will be automatically stored into EEPROM memory storage.

6-2 STORING VFO FREQUENCIES AND DATA INTO MEMORY

The process to save a displayed VFO frequency to memory is as follows:

1. In VFO mode, select the required frequency, mode, etc.
2. Press and hold the [ENT] key for two seconds. The AR-DV1 will automatically find the next available vacant memory channel.
3. Using the keypad, select the desired memory location (bank and channel).
4. Add a text comment (optional) or delete an existing comment.
5. Press the [ENT] key to exit the menu and save the data to the specified memory location.

   (Example) Storing the frequency of 145.000 MHz into memory bank "**3**" location "**25**" (0325) while in VFO mode.

If a mistake is made during programming, press the [CLR] key to abort entry and return to VFO mode.

1. Start by selecting VFO mode, then enter the frequency of 123.500 MHz.

   a) Press the [VFO] key to set the AR-DV1 into the VFO mode.

   b) Press the [1] key.

   c) Press the [4] key.

   d) Press the [5] key.

   e) Press the [.] (decimal) key.

   f) Press the [0] key.

   g) Press the [ENT] key.

2. Press and hold the [ENT] key for two seconds.

3. The bank title (BANK BANK__[BK.TITLE]) and channel title (CH CH__[CH.TITLE]) will appear alternatively on the bottom of the LCD. If those titles are already registered, those titles will be displayed.

4. Using the numeric keypad, enter the bank and channel number. (Four digits total)

```
 VFO  FM 15DDSTRDA  20k
A        145.000 00
B             435.000 00
 B +20 ██████▌    ╷   ╷   ◼
MEM.WR              00-00
BANK        BANK___TITLE
```
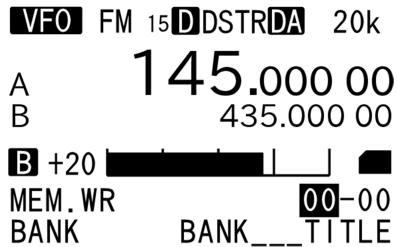
5. Enter the title for the memory channel.   A maximum of 12 characters may be added to each memory channel.

```
 VFO  FM 15DDSTRDA  20k
A        145.000 00
B             435.000 00
 B +20 ██████▌    ╷   ╷   ◼
MEM.TITLE          00-00
                CH_____TITLE
```
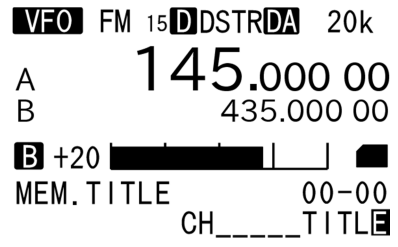
6. Press the [▼] key to move the cursor.

7. To protect/unprotect the memory channel, rotate the dial to select ON (protect) or OFF (unprotect).

```
 VFO  FM 15DDSTRDA  20k
A        145.000 00
B             435.000 00
 B +20 ██████▌    ╷   ╷   ◼
MEM.TITLE          00-00
PROTECT                OFF
```
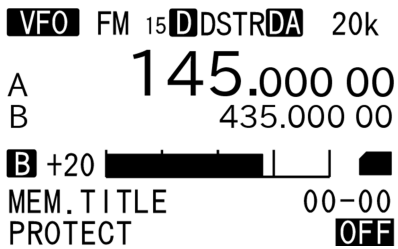
8. Press the [ENT] key to complete memory registration.

6-3 MEMORY READ

Once frequency and mode data have been stored into a memory location, retrieval is quick and simple.

While in VFO mode, press the [SCAN] key.

There are 40 banks (#00 ~ 39), 50 channels per bank with the AR-DV1.

$$\boxed{\text{MEM}}$$

05-00 **380.**212 50
MEMCH__TITLE

(Sample of memory read screen)

1. If you already know the memory bank and memory channel, using the numeric keyad, enter the memory bank number (two digits) and memory channel number (two digits). Then press the [ENT] key.
        (Above screen shows memory bank #05 and memory channel #00.)
2. The AR-DV1 will monitor whatever memory channel you enter into memory read.
3. While in memory read, changing the receive mode or frequency steps, etc. will automatically update the memory contents.
4. If you don't want to make changes, set memory protect to ON to avoid overwriting the contents.
5. To return to VFO mode, press the [VFO] key.

6-4 DELETE MEMORY CHANNEL

To delete memory channels, perform the following steps:

1. In the memory read mode, press the [F] key and then the [CLR] key.
2. Following screen will appear.
3. To delete the selected memory channel, press the [ENT] key. Alternatively, press the [CLR] key to cancel entry.
4. After deleting the memory channel, it will return to VFO mode.

(Note: If the memory channel is write protected, it will not be deleted.)

```
DEL.MEM.CH.      1/1
BANK-CH         01-01
FRQ.        145.000 00
TITLE      CHANNEL_TITL


Cancel[CLR] Del[ENT]
```

7   SCAN – SCANNING MEMORY CHANNELS

The AR-DV1 has a scan mode whereby the contents stored in the memory channels are automatically recalled and monitored very quickly for activity – scanned.

(*Note: It is important that you do not confuse **SCAN** and **SEARCH** modes.*)

SEARCH mode (covered later in this manual) automatically tunes the receiver through all frequencies between two specified frequency limits looking for active frequencies.

7-1   SCAN – OUTLINE INTRODUCTION

During scan, the AR-DV1 automatically recalls memory channels which contain data in numeric order and monitors looking for activity. When an 'active' memory channel is located (when a signal is found and the squelch is open), the AR-DV1 will temporarily stop scanning.

7-2   STARTING SCAN

Presuming that some memory channels are programmed with data, from the Memory Read mode screen ("MEM" is displayed), start the scan process with one press of the [SCAN] key. Once the scan process has been started, "SCN" and a bank number will be displayed representing the current bank.

Ensure that the squelch is set to the threshold point so that background noise is cancelled and the squelch closes (otherwise scan will not operate).

When scan has been selected, only the currently displayed memory bank which contains data will be scanned, and receive mode and frequency are not important. Any memory channels which contain no data (empty) will be ignored and skipped.

7-3   SELECTING A SCAN BANK

The memory bank identifier (such as "**03**") will be displayed on the middle of the LCD.

If more than one memory channel is programmed into the current memory bank, and when an 'active' channel has been located (busy, so the squelch opens), the scan process will temporarily pause on the active channel. The memory location (such as "**25**") will be displayed along with any accompanying text.

To select another memory bank for scanning, rotate the dial knob or enter the two digits of the memory bank number from the numeric keypad.

To exit from scan mode, press the [VFO] key.

7-4   LOCKING OUT UNWANTED ACTIVE MEMORY CHANNELS (PASS)

It is possible to lock out (PASS) unwanted memory channels while in scan mode. This is useful to eliminate unwanted permanent transmissions. It is important to understand the PASS function before

taking action or transmissions may be missed.

In memory read mode or while stopped on an unwanted frequency, press the [PASS] key.
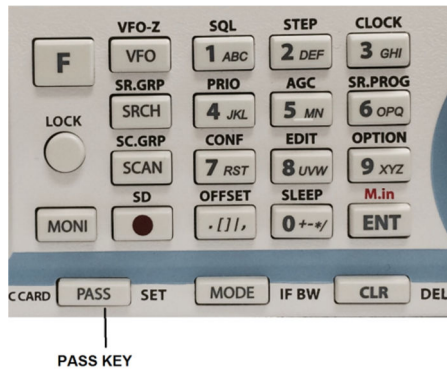
PASS KEY

Pressing the [PASS] key again on the same memory channel will de-select pass channel.

The scan process will resume. It will appear that all channels are still scanned, however, locked out channels will be 'skipped', the scan will not stop on locked out channels.

7-5 SCAN GROUP

The AR-DV1 has 20 scan groups to be used with the bank link function and other functions.

The following parameters can be registered for each of the scan groups.

- Bank link setting
- Scan pause
- Scan delay

To set up scan group, press the [F] key and then the [SCAN] key.

```
SCAN GROUP        1/2     SCAN GROUP        2/2
BANK LINK           0     DELAY            2.0
                          FREE             OFF
00 01 02 03 04 05 06 07 08 09
10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38 39

Cancel[CLR] SET[ENT]      Cancel[CLR] SET[ENT]
```

7-5-1 BANK LINK SETTING

1. There are 10 scan groups and the group number can be selected between 0 ~ 9.

   Rotate the dial knob to select the scan group. Then press the [▼] key to go to the bank select menu. You can also use the numeric keypad to select the scan group.

   To return to scan group selection menu, press the [▲] key.

2. Rotate the dial knob to select the bank link group. Pressing the [PASS] key will toggle the link on and off.

3. Press the [ENT] key to complete setting or press the [CLR] key to abort entry.

7-5-2 SCAN DELAY

The scan delay parameter affects the time the AR-DV1 will remain on an active channel in the scan mode once the received signal has disappeared and the squelch is closed. This is particularly useful

for customizing how long the receiver will wait for a reply before continuing to scan.

The parameter ranges are off, hold and 0.1 to 9.9 seconds in 0.1 second increments. (Default: 2.0 seconds)

To set the scan delay parameter, perform the following steps:
1. On the scan group setting screen, use the [▼] key or [▲] key to select [DELAY].
2. Rotate the dial knob to select the scan delay.
3. If "HOLD" is selected, the receiver will stop scanning
4. To confirm entry, press the [ENT] key. To set other parameters, press the [▼] key.

7-5-3　SCAN PAUSE

The scan pause parameter determines how long the receiver will remain on an active channel before resuming scanning even if the channel is still busy. Scan pause helps keep you from having to manually intervene to force the scan to continue or use channel lockout (pass).

The parameter ranges are off and 1 to 60 seconds. When the parameter is set to off, the receiver remains on the busy channel until the received signal disappears or the memory channel is changed.
To set the scan pause parameter, perform the following steps:
1. On the scan group setting screen, use the [▼] key or [▲] key to select [FREE].
2. Rotate the dial knob to set scan pause parameter (between 1 ~ 60 or off). To set scan pause to off (zero), press the [PASS] key or enter "0" from the numeric keypad.
3. To confirm entry, press the [ENT] key.

8 SEARCH MODE

In search mode, the AR-DV1 is programmed to automatically tune between two specified frequency limits looking for activity. Before activating search mode, the squelch must be set to the threshold where the background noise disappears.

8-1 SEARCH TYPE

The AR-DV1 is equipped with VFO search, program search.

> **VFO SEARCH** = Search between two VFO frequencies
>
> **PROGRAM SEARCH** = Search between user preprogrammed frequency limits

8-1-1 VFO SEARCH

The VFO search is the easiest way of searching without programming.

When the VFO-A is selected as a primary VFO, the AR-DV1 will search between two frequencies on VFO-A and VFO-B with receive mode, frequency step set in the VFO-A.

VSR

A 118.000 00
B 135.975 00

VFO search screen

To activate the VFO search, perform the following steps:

1. In VFO mode, press and hold either the [**VFO**] key, [▼] key, or [▲] key for more than two seconds. The search process starts. The search direction can be changed by rotating the dial knob or pressing the [▼] key or [▲] key.

2. When the receiver stops on a busy frequency, you can resume manual search by rotating the dial knob or pressing the [▼] key or [▲] key.

3. While the receiver stops on receive signal, pressing the [PASS] key will register the receive frequency to the VFO pass frequencies. This frequency will be locked out (passed) after the next search and will not be received.

4. To stop the VFO search, press the [VFO] key.

To delete pass frequencies, perform the following steps:

1. While stopped on unwanted frequency, press and hold the [PASS] key for two seconds. The following screen will appear.

10:08:59
VFO FM 15D DSTR DA 20k

A 145. 000 00

VFO-PASS
01 145.060 00
[PASS] DELETE
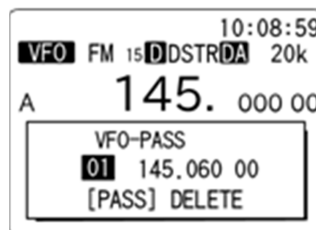
2. Rotate the dial knob to select the desired frequencies to be deleted.

3. To delete all pass frequencies, press the [F] key and then the [PASS] key.

8-1-2 PROGRAM SEARCH

The AR-DV1 has 40 program search banks (referred to simply as search banks) which can be programmed with specific parameters:

- LO (lower) start frequency
- HI (upper) stop frequency
- Receive mode (or set to AUTO MODE)
- Text comment

The program search banks are identified by numbers (00 ~ 39). To help with identification, each bank may be labeled with an alphanumeric text comment.

8-1-2-1 STARTING PROGRAM SEARCH

Presuming that data is already stored into a search bank.

Press the [**SRCH**] key to start the program search process.

<div align="center">

`SER`

25   **145**.000 00
      SEARCH_TITLE

</div>

"SER" icon will be displayed on the top left of the LCD. As long as the squelch is closed, the search process will start from the lower frequency limit and will progress toward the upper frequency limit. When the program limit is reached, the search loops around and starts the process again.

Note: If no search banks have been programmed, the search will not operate.

8-1-2-2 REVERSING THE SEARCH DIRECTION

To reverse the search direction, rotate the dial knob or press the [▼] key or the [▲] key.

This is useful to enable you to search back over an interesting point of the search process.

8-1-2-3 FORCING THE SEARCH TO RESUME

If the AR-DV1 stops on an unwanted busy frequency, rotate the dial knob or press the [▼] key or [▲] key to force the search process to resume from the current frequency displayed.

8-1-2-4 STOPPING THE SEARCH

While the search process is in progress (not stopped), press the [VFO] key (displaying the data on-screen before search was started).

8-1-2-5 SELECTION OF SEARCH BANK

There are 40 search banks. Select a search bank by entering its two digit number into the keypad.

8-1-2-6 PROGRAMMING A SEARCH BANK

Each of the 40 search banks may be programmed with different frequency limits, receive modes, etc.
To program a search bank, perform the following steps:

1. Press the [F] key and then the [6] key to access the search program menu.
   The next available or vacant search bank number will be displayed.
2. Rotate the dial knob to select the search bank to program or overwrite.
   You may use the keypad to enter a 2 digit number to select the search bank number.
3. Press the [▼] key to move the cursor downward to select [L.FRQ.]
   Using the numeric keypad, enter the lower frequency limit in MHz format.
4. Press the [ENT] key. After an entry of the frequency, the cursor will automatically move downward
   to [U.FRQ.]
5. Using the numeric keypad, enter the upper frequency limit in MHz format.
6. Press the [ENT] key. After an entry of the frequency, the cursor will automatically move downward
   to [STEP].
7. Rotate the dial knob to select the frequency step. You may use the keypad for entry.
   In this setting, pressing the [PASS] key will move to step adjustment setting screen. (optional)
8. Press the [▼] key to move to [MODE] on the next page.
9. Select the desired mode in the range of available analog and digital modes.
10. Rotate the dial to select the desired IF filter bandwidth.
11. Press the [▼] key to move the cursor downward to select [TITLE].
12. Using the keypad, enter the search bank title. Move the cursor using the dial. If needed you can
   erase a character with the [▲] key.
13. Press the [▼] key to move the cursor downward to select [PROTECT].
14. Rotate the dial knob to select ON or OFF.
15. Press the [ENT] key to confirm all entries or press [CLR] to abort.

```
 SRCH BANK       1/2     SRCH BANK       2/2
 ─────────────────────   ─────────────────────
 BANK            07       MODE           P-25
 L.FRQ.      100.00k      IFBW            15k
 U.FRQ.   1300.000 00     TITLE    SRCH_BNK_TTL
 STEP          100k       PROTECT         OFF
 ─────────────────────   ─────────────────────
 Cancel[CLR] Set[ENT]     Cancel[CLR] Set[ENT]
```

8-1-2-7 LOCKING OUT UNWANTED ACTIVE FREQUENCIES (PASS)

It is possible to lock out (pass) unwanted frequencies while in the program search mode. This is
useful to eliminate unwanted permanent transmissions. Up to 30 pass frequencies can be registered
for each search bank. A total of 1200 pass frequencies can be registered in the AR-DV1. It is important
to understand the pass function before taking action or transmissions may be missed.

To pass the frequency in search mode, press the [PASS] key while stopped on an unwanted frequency.

8-1-2-8 DELETING PASS FREQUENCIES

To delete pass frequencies, perform the following steps:

1. While stopped on unwanted frequency, press and hold the [PASS] key for two seconds. The following screen will appear.

```
                           10:08:59
SER  FM 15 D DSTR DA  20k
23      145. 000 00
   ┌──────────────────────┐
   │    SRCH-PASS  23      │
   │  02  145.120 00       │
   │    [PASS] DELETE      │
   └──────────────────────┘
```
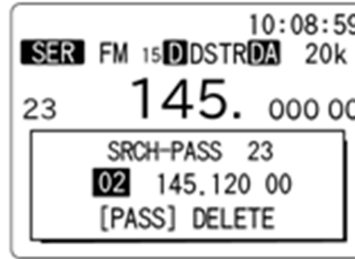
2. Above screen displays the last selected search bank. Rotate the dial knob to select the desired search bank that contains the frequency to be deleted.

3. Press the [▼] key and then the [PASS] key to delete pass frequency.

4. To delete all pass frequencies in the current search bank, press the [F] key and then the [PASS] key.

8-1-2-9 DELETING SEARCH BANK

To delete search bank, perform the following steps:

1. While on program search receive mode, press the [F] key and then the [CLR] key. The following screen will appear

.

```
┌────────────────────────┐
│ DEL.SRCH BANK     1/1   │
├────────────────────────┤
│ BANK              07    │
│ L.FRQ.       100.00k    │
│ U.FRQ.    1300.000 00   │
│ TITLE     SRCH_BNK_TTL  │
│                         │
├────────────────────────┤
│ Cancel[CLR] Del[ENT]    │
└────────────────────────┘
```
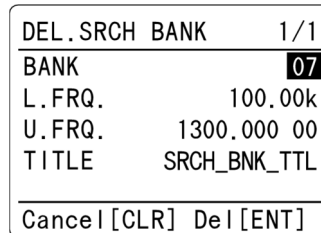
2. Rotate the dial knob to select the desired search bank to be deleted.

3. Press the [ENT] key. Alternatively, press the [CLR] key to cancel entry.

After deleting the search bank, it will return to VFO-A mode.

8-2 SEARCH GROUP

The AR-DV1 has 20 search groups to be used with the bank link function and other functions.

The following parameters can be registered for each of the search groups.

- Bank link setting
- Search pause
- Search delay

```
┌──────────────────────┐  ┌──────────────────────┐
│ SRCH GROUP      1/2   │  │ SRCH GROUP      2/2   │
├──────────────────────┤  ├──────────────────────┤
│ BANK LINK        0    │  │ DELAY          2.0    │
│ 00 01 02 03 04 05 06 07 08 09 │ FREE          OFF │
│ 10 11 12 13 14 15 16 17 18 19 │ STORE         OFF │
│ 20 21 22 23 24 25 26 27 28 29 │ DEL.BK39      OFF │
│ 30 31 32 33 34 35 36 37 38 39 │                   │
├──────────────────────┤  ├──────────────────────┤
│ Cancel[CLR] SET[ENT] │  │ Cancel[CLR] SET[ENT] │
└──────────────────────┘  └──────────────────────┘
```
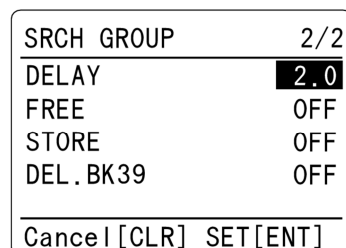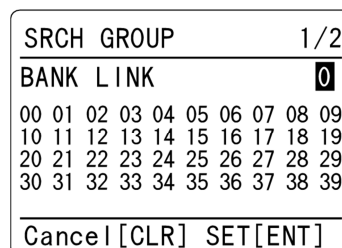
To set up a search group, press the [F] key, then press the [SRCH] key.

8-2-1 BANK LINK SETTING

1. There are 10 search groups and the group number can be selected between 0 ~ 9.

   Rotate the dial knob to select the search group. Then press the [▼] key to go to bank select menu. You can also use the numeric keypad to select the search group.

   To return to Search group selection menu, press the [▲] key.

2. Rotate the dial knob to select the bank link group. Pressing the [PASS] key will toggle the link ON and OFF.

3. Press the [ENT] key to complete setting or press the [CLR] key to abort entry.

8-2-2 SEARCH DELAY

The search delay parameter affects the time the AR-DV1 will remain on an active channel in the search mode once the received signal has disappeared and the squelch is closed. This is particularly useful for customizing how long the receiver will wait for a reply before continuing to search.

The parameter ranges are off, hold and 0.1 to 9.9 seconds in 0.1 second increments.
(Default: 2.0 seconds)

To set the search delay parameter, perform the following steps:

1. On the search group setting screen, use the [▼] key or [▲] key to select [DELAY].
2. Rotate the dial knob to select the search delay.
3. If "HOLD" is selected, the receiver will stop searching
4. To confirm entry, press the [ENT] key. To set other parameters, press the [▼] key.

8-2-3 SEARCH PAUSE

The search pause parameter determines how long the receiver will remain on an active frequency before resuming searching even if the channel is still busy. Search pause helps keep you from having to manually intervene to force the search to continue or use channel lockout (pass).

The parameter ranges are off and 1 to 60 seconds. When the parameter is set to off, the receiver remains on the busy frequency until the received signal disappears or the search frequency is changed.

To set the search pause parameter, perform the following steps:

1. On the search group setting screen, use the [▼] key or [▲] key to select [FREE].
2. Rotate the dial knob to set search pause parameter (between 1 ~ 60 or off). To set search pause to off (zero), press the [PASS] key or enter "0" from the numeric keypad.
3. To confirm entry, press the [ENT] key.

9 CONFIGURATION MENU

The configuration menu is used to set fundamental operating parameters and other variables which do not appear in any menu heading.

To access the configuration menu, press the [F] key and then the [7] key.

```
CONFIG          1/4        CONFIG          2/4
BEEP           OFF         KEY COLOR       OFF
CONTRAST        25         SQL.SKIP        OFF
BACKLIGHT     AUTO         ID               00
DIMMER          ON         REMOTE.BPS   115200
Cancel[CLR] Set[ENT]       Cancel[CLR] Set[ENT]


CONFIG          3/4        CONFIG          4/4
RES.CODE        ON         SYS.UPDATE     SET->
PROTECT        OFF
FIRM VER     1504A
SER.      09520008
Cancel[CLR] Set[ENT]       Cancel[CLR] Set[ENT]
```

CONFIGURATION MENU 1/4

BEEP	Confirmation tone
CONTRAST	Adjust LCD contrast
BACKLIGHT	LCD illumination
DIMMER	LCD dimmer

CONFIGURATION MENU 2/4

KEY COLOR	Keypad illumination color
SQL.SKIP	Record audio continuously/ stop while squelch closes
ID	Set receiver's identification number
REMOTE.BPS	Data communication speed

CONFIGURATION MENU 3/4

RES.CODE

PROTECT

FIRM VER	Display the firmware of the receiver
SER.	Serial number of the receiver

CONFIGURATION MENU 4/4

SYS.UPDARE	Firmware update

9-1 CONFIGURE BEEP

The AR-DV1 emits confirmation 'beeps' while the keypad is used to indicate correct operation.
The volume of the beep is independent of the volume control and can be separately defined. It is
recommended that the beep function be enabled to confirm data entry.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "BEEP" parameter in reverse contrast. Rotate the dial knob to select the
desired beep level between the range of OFF and 1 to 7 (loudest).   (Default: 2)

Press the [ENT] key to accept the entry and return to a standard display.
Alternatively, press the [CLR] key to abort entry.
Or, press the [▼] key to move to the next item on the configuration menu.

9-2 CONFIGURE CONTRAST

The AR-DV1 is equipped with variable LCD contrast which is adjustable in 64 steps to provide the best
visibility under different viewing angles.   The default setting for contrast is 25.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "CONTRAST" parameter in reverse contrast. Rotate the dial knob to select the
desired setting between the range of 00 ~ 50.

Press the [ENT] key to accept the entry and return to a standard display.
Alternatively, press the [CLR] key to abort entry.
Or, press the [▼] key to move to the next item on the configuration menu.

9-3 CONFIGURE BACKLIGHT

The AR-DV1 is equipped with high intensity LEDs to illuminate the LCD when operating in areas of low
level lighting. The backlight lamp may be configured in three ways:

  OFF   The lamp remains permanently extinguished. This is useful for areas with high light levels.
   ON   The lamp will continuously illuminate the LCD and keypad.
  AUTO This is **default** setting. The lamp will automatically illuminate the LCD and keypad when the front
            panel is used or squelch opens. The lamp will remain illuminated for five seconds after the last
            key is pressed. Then it will turn off.

To access the configuration menu, press the [F] key and then the [7] key.
Press the [▼] key to select "BACKLIGHT" parameter in reverse contrast. Rotate the dial knob to select the
desired setting.

Press the [ENT] key to accept the entry and return to a standard display.

Alternatively, press the [CLR] key to abort entry.

Or press the [▼] key to move to the next item on the configuration menu.

9-4 CONFIGURE DIMMER

The AR-DV1 is equipped with high intensity LEDs to illuminate the LCD when operating in areas of low level lighting.

The dimmer function adjusts the brightness of the backlit lamp and may be configured in two ways:

OFF   This is default setting. The lamp will illuminate normally.

ON   The brightness of the display may be decreased by approximately 50%. However, the brightness of the keypad will not be changed.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "DIMMER" parameter in reverse contrast. Rotate the dial knob to select the desired setting.

Press the [ENT] key to accept the entry and return to a standard display.

Alternatively, press the [CLR] key to abort entry.

Or, press the [▼] key to move to the next item on the configuration menu.

9-5 CONFIGURE KEYCOLOR

The AR-DV1 is equipped with high intensity LEDs to illuminate the keypad.

The color of the keypad may be configured in eight ways:

OFF (default)   The keypad will not be illuminated all the time.

The color of the backlit keypad can be selected from the following: BLUE, RED, MAGENTA, GREEN, CYAN, YELLOW, ORANGE

To access the configuration menu, press the [F] key, and then press the [7] key.

Press the [▼] key to select "KEYCOLOR" parameter in reverse contrast. Rotate the dial knob to select the desired setting.

Press the [ENT] key to accept the entry and return to a standard display.

Alternatively, press the [CLR] key to abort entry.

Or, press the [▼] key to move to the next item on the configuration menu.

9-6 CONFIGURE SQL.SKIP

The squelch skip menu is used to configure the SD card voice recording when squelch is open or closed.

When squelch skip is set to OFF, the recording process will take place even when the squelch is closed and no audio signal is present.

When squelch skip is set to ON, the recording process will take place only when the squelch is opened and an audio signal is present. This is the default setting.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "SQL.SKIP" parameter in reverse contrast.

Rotate the dial knob to select the desired setting.

Press the [ENT] key to accept the entry and return to a standard display.
Alternatively, press the [CLR] key to abort entry.
Or, press the [▼] key to move to the next item on the configuration menu.

9-7 CONFIGURE ID

It is possible to change the receiver's Identification address when multiple units are connected to the same port.

It is possible to connect up to 99 units at once while each receiver is assigned a different address.

The value is adjustable between 00 ~ 99. The default setting is 00.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "ID" parameter in reverse contrast. Rotate the dial knob to select the desired setting between the range of 00 ~ 99.

Press the [ENT] key to accept the entry and return to a standard display.
Alternatively, press the [CLR] key to abort entry.
Or, press the [▼] key to move to the next item on the configuration menu.

9-8 CONFIGURE REMOTE.BPS (BAUD RATE)

The Remote BPS Set menu is used to configure the communication port control settings as it is important that they exactly match those of an associated computer connection.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "REMOTE.BPS" parameter in reverse contrast. Rotate the dial knob to select the desired baud rate from 9600, 19200, 38400, 57600, 115200 bps. The default setting is 115200 bps.

Press the [ENT] key to accept the entry and return to a standard display.

Alternatively, press the [CLR] key to abort entry.

Or, press the [▼] key to move to the next item on the configuration menu.

9-9   CONFIGURE RES.CODE (RESULT CODE)

The RES.CODE set menu is used to choose if the result code to be added at the head of the response message of the remote command.

The selection is ON or OFF. The default setting is ON.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "RES.CODE" parameter in reverse contrast. Rotate the dial knob to select ON or OFF.

Press the [ENT] key to accept the entry and return to a standard display.

Alternatively, press the [CLR] key to abort entry.

Or, press the [▼] key to move to the next item on the configuration menu.

9-10   CONFIGURE LAST CHANNEL PROTECT

This menu is used to configure if the last channel memory is to be write-protected.

The selection is ON or OFF. The default setting is OFF.

Please refer to "Last Channel Memory" for details.

To access the configuration menu, press the [F] key and then the [7] key.

Press the [▼] key to select "PROTECT" parameter in reverse contrast. Rotate the dial knob to select the ON or OFF.

Press the [ENT] key to accept the entry and return to a standard display.

Alternatively, press the [CLR] key to abort entry.

Or, press the [▼] key to move to the next item on the configuration menu.

9-11   CONFIGURE FIRM VER   (FIRMWARE VERSION)

To display the current firmware version of the AR-DV1, perform the following steps:

 1. Press the [F] key and then the [7] key.

 2. Press the [▼] key to select "FIRM VER". The current firmware version of the AR-DV1 will be displayed.

Press the [ENT] key to return to a standard display. Alternatively, press the [CLR] key to abort entry.

Or, press the [▼] key to move to the next item on the configuration menu.

9-12   CONFIGURE SYS.UPDATE   (SYSTEM UPDATE)

This menu is to update the firmware of the AR-DV1. The new firmware may be updated using the firmware file downloaded onto a SD card.

New firmware versions will be available at http://www.aorusa.com/receivers/ar-dv1.html

To update the firmware, perform the following steps:

 1. Insert the SD card with the new firmware file into the card slot on the front panel of the AR-DV1 receiver.
 2. Press the [F] key and then the [7] key.
 3. Press the [▼] key to select "SYS.UPDATE" and validate with the [ENT] key.
 4. The firmware file will be displayed as shown here.

```
┌─────────────────────────┐
│ FIRM UPDATE       1/1   │
│                         │
│  1404B                  │
│ ▐1403C▌                 │
│                         │
│                         │
│ ───────────────────     │
│ Exit[CLR] Inst.[ENT]    │
└─────────────────────────┘
```
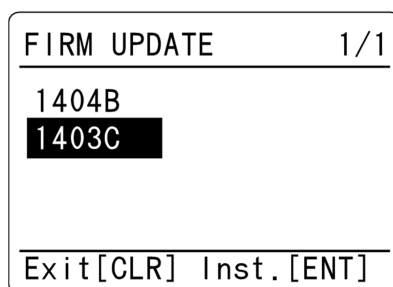
Example of the firmware files

 5. Using the [▼] key or [▲] key, select the desired firmware file from the list (if there is more than one version in the SD card).
 6. Press the [ENT] key. Update process will start.
 7. The update procedure takes 1 or 2 minutes. Once complete, disconnect the power (just switching the receiver off is not sufficient).
 8. After 30 seconds, reconnect the power and turn the receiver on.

(Note: The update process will re-initialize all receiver settings but memory banks content remains unchanged)

10 OPTION MENU

10-1 ACCESS OPTION MENU

To access the menu for other options, perform the following steps:

1. Press the [F] key and then the [9] key.

2. Following screen will appear.

```
OPTION            1/1
NR               MID
NOTCH            OFF
DIG.DECODE        ON


Cancel[CLR] Set[ENT]
```

10-2 NR (NOISE REDUCTION)

Noise reduction function is effective for random noise on the receive signal.

1. Rotate the dial knob to select the level from the choice of OFF, LOW, MID, and HIGH. (Default: OFF)

2. Press the [ENT] key to accept the entry. Alternatively, press the [CLR] key to abort entry, or press the

    [▼] key to move to the next item on the configuration menu.

10-3 NOTCH (AUTO NOTCH)

Auto notch function is effective for cycle noise on the receive signal.

1. Rotate the dial knob to select the level from the choice of OFF, LOW, MID, and HIGH. (Default: OFF)

2. Press the [ENT] key to accept the entry. Alternatively, press the [CLR] key to abort entry, or press the

    [▼] key to move to the next item on the configuration menu.

10-4 DIG.DECODE (DIGITAL SIGNAL DECODE)

When activated, character information such as call sign in digital mode can be displayed at the bottom of
the LCD.

10-5 CTCSS (CONTINUOUS TONE CONTROLLED SQUELCH SYSTEM)

CTCSS function will enable the AR-DV1 to selectively receive only specifically modulated sub-audible
tones or to verify the CTCSS frequency used.

(Note: This function operates only in FM mode with less than 30 kHz of IF-BW.)

To activate the function, perform the following steps:

1. Press the [F] key and then the [1] key.

```
TONE/CODE SQL    1/1

SQL              OFF
CTCSS            OFF
DCS              OFF
V.SCR           2000

Cancel[CLR] Set[ENT]
```

2. Press the [▼] key to select "SQL" parameter in reverse contrast.

3. Rotate the dial knob to select "CTC" in reverse contrast.

4. Press the [▼] key to select "CTCSS" parameter in reverse contrast.

5. Rotate the dial knob to select the desired CTCSS tone frequency from the range of 60 Hz ~ 254.1 Hz as shown on the list below. To set CTCSS off, select "OFF". Selecting "SRCH" will activate tone search function.

6. Press the [ENT] key to accept the entry and return to a standard display. Alternatively, press the [CLR] key to abort entry.

60.0	67.0	69.3	71.9	74.4
77.0	79.7	82.5	85.4	88.5
91.5	94.8	97.4	100.0	103.5
107.2	110.9	114.8	118.8	120.0
123.0	127.3	131.8	136.5	141.3
146.2	151.4	156.7	159.8	162.2
165.5	167.9	171.3	173.8	177.3
179.9	183.5	186.2	189.9	192.8
196.6	199.5	203.5	206.5	210.7
218.1	225.7	229.1	233.6	241.8
250.3	254.1			

CTCSS frequencies (in Hz)
Default: 60.0 Hz

10-6 DCS (DIGITAL CODED SQUELCH)

DCS function is used to decode a selected digital code that uses 23 bit code data sent lower than the voice frequency. The data speed is 134.3 bit/sec in NRZ (Non-Return-Zero) format FM modulation.

(*Note: This function operates only in the FM mode with less than 30 kHz of IF-BW.*)

To activate the function, perform the following steps:

1. Press the [F] key and then the [1] key.

```
TONE/CODE SQL      1/1

SQL                OFF
CTCSS              OFF
DCS                OFF
V.SCR              2000

Cancel[CLR] Set[ENT]
```

2. Press the [▼] key to select "SQL" parameter in reverse contrast.

3. Rotate the dial knob to select "DCS" in reverse contrast.

4. Press the [▼] key to select "DCS" parameter in reverse contrast.

5. Rotate the dial knob to select the desired DCS code from the list below. To set DCS off, select "OFF". Selecting "SRCH" will activate DCS search function.

6. Press the [ENT] key to accept the entry and return to a standard display. Alternatively, press the [CLR] key to abort entry.

017	023	025	026	031	032	036	043	047	050
051	053	054	065	071	072	073	074	114	115
116	122	125	131	132	134	143	145	152	155
156	162	165	172	174	205	212	223	225	226
243	244	245	246	251	252	255	261	263	265
266	271	274	306	311	315	325	331	332	343
346	351	356	364	365	371	411	412	413	423
434	432	445	446	452	454	455	462	464	465
466	503	506	516	523	526	532	546	565	606
612	624	627	631	632	654	662	664	703	712
723	731	732	734	743	754				

DCS codes
Default:017

10-7 SCR (ANALOG VOICE DESCRAMBLER)

(*Not available for US consumer version*)

Analog voice descrambler is used to decode scrambled analog voice transmission by frequency inversion.

(Note: This function operates only in FM mode with less than 30 kHz of IF-BW.)

To activate the function, perform the following steps:
1. Press the [F] key and then the [1] key.

```
TONE/CODE SQL     1/1

SQL               OFF
CTCSS             OFF
DCS               OFF
V.SCR             2000

Cancel[CLR] Set[ENT]
```

2. Press the [▼] key to select "SQL" parameter in reverse contrast.
3. Rotate the dial knob to select "SCR" in reverse contrast.
4. Press the [▼] key to select "V.SCR" parameter in reverse contrast.
5. Rotate the dial knob to select the inversion frequency from the range of 2000 Hz ~ 7000 Hz in 10 Hz steps. (Default: 2000 Hz) Once properly selected, the decoded voice becomes intelligible.
6. Press the [ENT] key to accept the entry and return to a standard display.
     Alternatively, press the [CLR] key to abort entry.

11 MISCELLANEOUS FUNCTIONS

11-1 FREQUENCY STEP AND STEP ADJUST

11-1-1 FREQUENCY STEP

To select frequency step, perform the following steps.

1. Press the [F] key and then the [2] key.
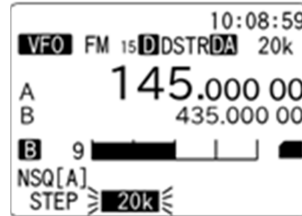
2. Rotate the dial knob to select one of the following preset frequency steps:

0.01kHz (10Hz), 0.05kHz (50Hz), 0.1kHz (100Hz), 0.5kHz (500Hz), 1kHz, 2kHz, 5kHz, 6.25kHz, 7.5kHz, 8.33kHz, 9kHz, 10kHz, 12.5kHz, 15kHz, 20kHz, 25kHz, 30kHz, 50kHz, 100kHz, 500kHz.

3. Press the [ENT] key to confirm entry or press the [CLR] key to abort entry.

11-1-2 STEP ADJUST

Step adjust function is used when the receiving frequency is not divisible by the current step size to follow unusual band plans.

(Example):
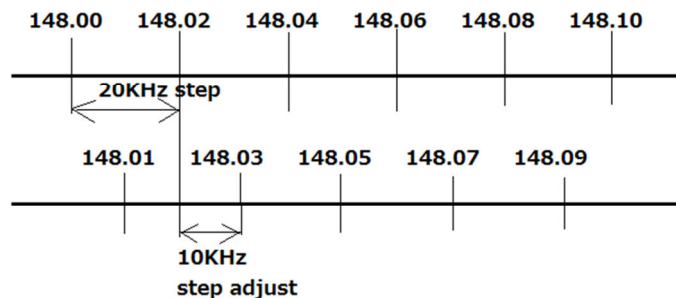
To activate the step adjust function, perform the following steps:

1. Press the [F] key and then the [2] key.

2. Press the [PASS] key.

54

```
                              10:08:59
VFO  FM  15 D DSTR DA  20k
A           145.000 00
B               435.000 00
B +20 ▮▮▮▮▮▮▮▮▮▮▮ I ▯ ▮
NSQ[A]
 STEP  20k  ADJ+ ≥▮10k≤
```
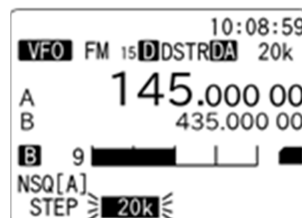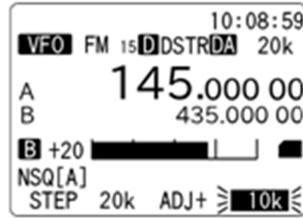
3. Rotate the dial knob to select the preset step adjust frequency. In above sample frequency setting, a half of the current frequency step (i.e. 10kHz) will be initially selected. Note that the step adjust can be selected only less than a half of current frequency.

(Note: The step frequency must be higher than 0.1kHz to use this function.)

4. Press the [ENT] key to confirm entry or press the [CLR] key to abort entry.

11-2   DIAL KNOB SETTING

In normal conditions, the dial knob increments or decrements the frequency by STEP SIZE currently set, for each "click" when the dial is turned.

To check the current step size:

1. Press the [F] key and then the [2] key.

2. Current step frequency will be displayed at the bottom left of the LCD in reverse contrast.

3. Rotate the dial knob to select another step if needed.

4. Press the [ENT] key to accept the entry and return to standard display.

There is the possibility to temporarily multiply that step size by a factor of ten, at which the frequency is changed.

To select the multiplying function: press the [F] key, then rotate the dial to change the frequency.

Press [F] again to return to normal speed.

The step size multiplication function does also work for the [▼] key and [▲] tuning keys above the dial knob.

11-3   CLOCK / TIMER

The AR-DV1 is equipped with a real time clock capable of 24 H format displaying hours, minutes, and seconds.

(*Caution: To use the* clock *function, power MUST be connected all the time. Disconnecting power will erase clock and timer settings*)

11-3-1   INITIAL SET

To access the clock set menu, perform the following steps:

11-3-1-1   TIME SETTING

1. Press the [F] key and then the [3] key. Below screen will appear on the LCD.

```
┌─────────────────────────────┐
│ CLOCK              1/1       │
│ ALARM/TIMER       [SET→]     │
│ CLOCK(YY-MM-DD HH:MM)        │
│          14-04-30 15:00      │
│                             │
│ ─────────────────────────── │
│ Cancel[CLR] Set[ENT]        │
└─────────────────────────────┘
```
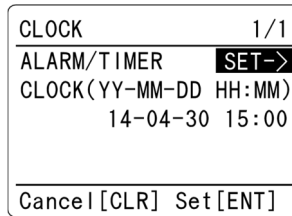
2. Press the [▼] key to select "CLOCK" parameter in reverse format.

3. Using the numeric keypad, enter the current time in YY-MM-MM HH:MM format.

4. Press the [ENT] key to accept entry.   Alternatively, press the [CLR] key to abort entry.

11-3-2 ALARM / TIMER CONFIGURATION

To access the ALARM/TIMER menu, perform the following steps:

1. Press the [F] key and then the [3] key.

2. While ALARM/TIMER parameter (SET->) is selected in reverse contrast, press the [ENT] key.

3. Following screen will appear.

```
┌─────────────────────────────┐
│ ALARM/TIMER        1/3       │
│ NUMBER               1       │
│ TYPE              TIMER       │
│ REPEATS          SINGLE       │
│                             │
│ ─────────────────────────── │
│ Cancel[CLR] Set[ENT]        │
└─────────────────────────────┘
```
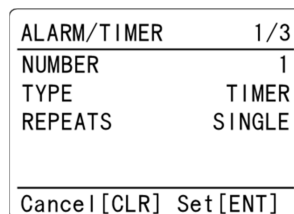
4. Press the [▼] key to select "NUMBER" in reverse contrast.

5. The AR-DV1 is equipped with three independent alarm/timer functions. Rotate the dial knob to select the number (from 1 ~ 3) to set ALARM/TIMER.

6. Press the [▼] key to select "TYPE" parameter in reverse contrast.

7. Rotate the dial knob to select from "ALARM", "TIMER" or "OFF". If "OFF" is selected, ALARM/TIMER will not function. (Default: OFF)

8. Press the [▼] key to select "REPEATS" in reverse contrast.

9. Rotate the dial knob to select either "SINGLE" or "WEEKLY". (Default: SINGLE)

10. Press the [▼] key to move to the next configuration menu.

11. Following screen will appear.

```
┌─────────────────────────────┐
│ ALARM/TIMER        2/3       │
│        [MM-DD HH:MM]         │
│ START  [05-23 13:00]         │
│ END     05-23 16:00          │
│                             │
│ ─────────────────────────── │
│ Cancel[CLR] Set[ENT]        │
└─────────────────────────────┘
```

11-3-2-1 ALARM

When "ALARM" is selected on the above configuration menu, go to these next steps:

"SINGLE" event: The alarm function will operate one time only.

1. Using the numeric keypad, enter the start time in MM-DD HH:MM format.

2. Press the [▼] key to move cursor download.

3. Using the numeric keypad, enter the end time in MM-DD HH:MM format.

4. Press the [ENT] key to confirm entry. Alternatively, press the [CLR] key to abort entry.

```
ALARM/TIMER        2/3
            [MM-DD HH:MM]
START    05-23 13:00
END      05-23 16:00


Cancel[CLR] Set[ENT]
```

"WEEKLY" events: The alarm function will operate repeatedly on selected day of the week.

```
ALARM/TIMER        2/3
              [HH:MM]
START         13:00
END           16:00
Mo Tu We Th Fr Sa Su

Cancel[CLR] Set[ENT]
```

1. Using the numeric keypad, enter the start time in MM-DD HH:MM format.
2. Press the [▼] key to move cursor download.
3. Using the numeric keypad, enter the end time in MM-DD HH:MM format.
4. Press the [▼] key to move cursor download.
5. Rotate the dial knob to select the day of the week.
6. Press the [PASS] key to select/deselect the day. When selected, the underscore will appear on the bottom of the selected day.
7. Repeat above step as needed.
8. Press the [ENT] key to confirm entry. Alternatively, press the [CLR] key to abort entry.

11-3-2-2 TIMER

The timer function is designed to record the voice signal on SD card automatically at preset time.

When "TIMER" is selected on the above configuration menu, go to these next steps:

"SINGLE" event: The alarm function will operate one time only.
1. Using the numeric keypad, enter the start time in MM-DD HH:MM format.
2. Press the [▼] key to move cursor download.
3. Using the numeric keypad, enter the end time in MM-DD HH:MM format.
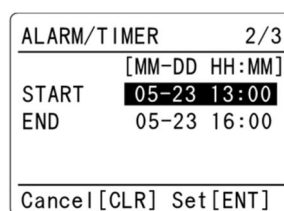4. Press the [ENT] key to confirm entry. Alternatively, press the [CLR] key to abort entry.

```
ALARM/TIMER        2/3
            [MM-DD HH:MM]
START    05-23 13:00
END      05-23 16:00


Cancel[CLR] Set[ENT]
```

"WEEKLY" events: The alarm function will operate repeatedly on selected day of the week.

```
ALARM/TIMER        2/3
                 [HH:MM]
START            13:00
END              16:00
Mo Tu We Th Fr Sa Su

Cancel[CLR] Set[ENT]
```

1. Using the numeric keypad, enter the start time in MM-DD HH:MM format.

2. Press the [▼] key to move cursor download.

3. Using the numeric keypad, enter the end time in MM-DD HH:MM format.

4. Press the [▼] key to move cursor download.

5. Rotate the dial knob to select the day of the week.

6. Press the [PASS] key to select/deselect the day. When selected, the underscore will appear on the bottom of the selected day.

7. Repeat above step as needed.

8. Press the [▼] key to go to next configuration menu.

```
ALARM/TIMER        3/3
SRC              MEMR
            04-02 JOLF R
ALARM VOL         000
SQL OPEN           ON

Cancel[CLR] Set[ENT]
```

SRC: Select signal source

        VFO: VFO-A, VFO-B, VFO-Z (Default: VFO-A)

        V-SR: VFO Search

        SRCH: Program search --- Select search bank

        MEMR: Memory channel --- Select memory bank, memory channel

        SCAN: Memory scan --- Select memory bank. Priority channel available

ALARM VOL: Volume level (Default: 00)

        (Available only when "ALARM" is selected on above configuration menu.)

        (Volume level: zero (0) when "TIMER" is selected on above configuration menu.)

SQL OPEN: When set to "ON", squelch will force to open when alarm or timer activated.

        When set to "OFF", squelch will operate according to the preset level.
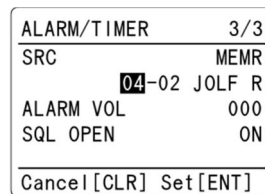
        (Default: OFF)

11-3-3   ALARM ACTIVATION

Once the alarm has been activated, "A" in reverse contrast will blink on the top middle of the LCD. The AR-DV1 will switch on automatically (presuming the receiver had been switched off) on a daily basis or weekly basis at the defined volume level and for the programmed length of time before automatically switching off again until the same time on the following day. To cancel alarm function, press any key.

11-3-4   OPERATION DURING TIMER FUNCTION

While timer function is activated, all panel keys, squelch knob and dial knob will be disabled except the [CLR] key.

By pressing and holding the [CLR] key for two seconds, the following screen will appear.

```
                           📧 10:08:59
  [VFO] FM200             100k

  A         81.300 00

    ┌─────────────────────┐
    │  CANCEL TIMER REC?   │
    │  NO[CLR]  YES[ENT]   │
    └─────────────────────┘
```
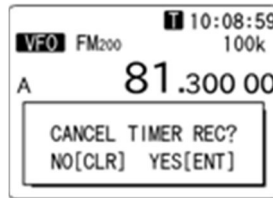
Press the [ENT] key to cancel recording and return to normal display. Recorded signals will be saved on SD card.

If no SD card is inserted into slot, an error message will appear.

```
                           📧 10:08:59
  [VFO] FM200             100k

  A         81.300 00

    ┌─────────────────────┐
    │      SD  ERROR       │
    └─────────────────────┘
```

11-3-5 SLEEP TIMER

Once the sleep timer is activated, the AR-DV1 will automatically switch off after the sleep time duration has expired.

To set sleep timer, perform the following steps:
1. Press the [F] key and then the [0] key.
2. On the sleep timer screen, rotate the dial knob to select sleep time from the period of 0, 15, 30, 60, 90, 120 minutes. (0: Sleep timer off) (2)

```
                    ① ②
            [S][120MIN] 10:08:59
    [VFO] FM 15[D]DSTR[DA] 20k
    A       145.000 00
    B           435.000 00
    [B] +20 ▌▌▌▌  ▌  |  | ▬
    NSQ[A]
```
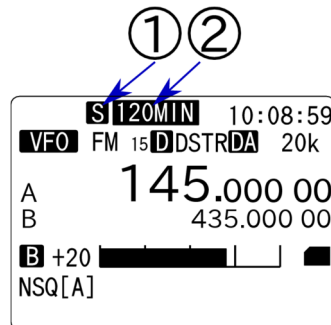
3. Press the [ENT] key to accept the entry and the sleep timer will start.
   The "S" icon with reverse contrast will start to blink. (1) Alternatively, press the [CLR] key to abort the entry.
4. To deactivate the sleep timer, repeat above steps 1 and 2 then select "0".

(*Note: Do not press the volume knob while the sleep timer is activated.*)

11-4　PRIORITY FUNCTION

The priority function enables you to carry on scanning, searching or monitoring while the AR-DV1 checks a selected frequency for activity (taken from one of the 2,000 memory channels periodically).

The priority checking is accomplished by momentarily tuning the receive circuit to the priority frequency to see if it is **active**. If activity is found, the AR-DV1 will remain on the active frequency until the signal disappears. If no activity is detected, the receiver returns to the VFO frequency, scan channel or search bank from where it originated.

The priority function has a large number of applications and is particularly useful for keeping an eye on a distress frequency while scanning or searching another frequency band.

Note: Depending upon the frequency and mode stored as priority, an audible **click** may be heard when the priority function is in operation. This is quite normal and is caused by the internal switching of circuitry necessary to accomplish the frequency change.

11-4-1　CONFIGURING PRIORITY CHANNEL

Once activated, the frequency is periodically checked for activity based on the preset period set by the configuration menu.

To configure the priority function, perform the following steps:

(Example): Select memory bank 1, memory channel 30, priority sampling interval 10 seconds

1. Press the [F] key. Then press and hold the [4] key for two seconds.

The priority channel configuration menu appears.

```
┌─────────────────────────┐
│ PRIORITY          1/1   │
│ ┌─────┐                 │
│ │03-15│   380.212 50    │
│ └─────┘   MEMORY_TITLE  │
│ INTERVAL            5    │
│                         │
│ ─────────────────────── │
│ Cancel[CLR] SET[ENT]    │
└─────────────────────────┘
```

2. Use the numeric keypad or rotate the dial knob to select the memory bank and memory channel.
3. Press the [▼] key to select "INTERVAL" parameter in reverse contrast.
4. Rotate the dial knob to select the desired time from the range of 1 ~ 99 seconds.
5. Press the [ENT] key to accept the entry and return to a standard display.

Alternatively, press the [CLR] key to abort entry.

11-4-2　ACTIVATING PRIORITY FUNCTION

To activate the priority function, press the [F] key and then the [4] key.

"PRI" will be displayed on the bottom left of the LCD.

To de-activate the function, repeat above steps.

11-5   RESET THE AR-DV1

Resetting the AR-DV1 will return it to the original factory default settings and all memory contents will be deleted.

There are two types of resetting; System Reset and Full Reset.

11-5-1   SYSTEM RESET

Performing System Reset will return it to the original factory default settings.

However, all search banks, search groups, memory channels, memory banks, scan groups and memory contents will not be deleted.

To perform System Reset, perform the following steps:

1. Turn the receiver off.
2. While holding the [CLR] key, push and hold the volume knob until [Sys.Reset] is displayed on the LCD.

11-5-2   FULL RESET

Performing Full Reset will return it to the original factory default settings. All personal settings will be lost.

To perform Full Reset, perform the following steps:
1. Turn the receiver off.
2. While holding the [CLR] key, push and hold the volume and squelch knobs until [FullReset] is displayed on the LCD.

11-6   FREQUENCY OFFSET

The frequency offset function enables receive frequency to be shifted by preprogrammed value.
This function helps quickly to track duplex transmissions or check repeater inputs/outputs.
Some offset frequencies have been preprogrammed by the factory. Frequency offset may also be programmed manually by the user.

The locations for frequency offset storage are numbered 20 ~ 39 and cannot be changed by the user.
Locations 01 ~ 19 may be programmed by the user. To configure the frequency offset, perform the following steps:
 1. Press the [F] key and then the [.] (SD) key.
 2. The frequency offset screen will appear.
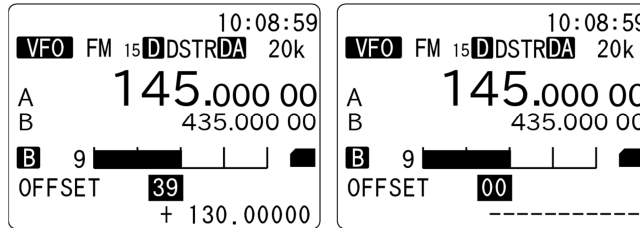
3. Rotate the dial knob to select the offset channel.

   00:       Cannot be changed

   01 ~ 19: User programmable

   20 ~ 39: Preprogrammed by factory (cannot be changed)

4. To change the user programmable channel, enter the offset frequency from the numeric keypad.

5. To change the shift direction, press the [PASS] key to toggle between "+" and "-".

6. To confirm entry, press the [ENT] key. Alternatively, press the [CLR] key to cancel entry.

11-7   LAST CHANNEL MEMORY

When the AR-DV1 is switched off, the receiver's settings will be automatically saved on the last channel memory and will be recalled the next time the unit is switched on.

The following parameters will be saved:

1. In VFO mode: Receive frequency

   In VFO search mode: Frequency, search direction

   In Program search mode: Bank number, frequency, search direction

   In Memory read mode: Bank number, channel number

   In Memory scan mode: Bank number, channel number, scan direction

2. Step frequency, Step adjust

3. Receive mode

4. Squelch type (Noise squelch, Level squelch, CTCSS, DCS code, ON/OFF status)

5. AGC setting

6. Optional settings (Noise Reduction, Auto Notch, Digital mode settings, etc.)

7. Last used frequency on VFO, VFO search, program search, memory bank, scan group contents

8. IF bandwidth

9. Alarm/Timer settings

10. Priority settings

To save the current settings of the AR-DV1, press the [F] key then push the volume knob.
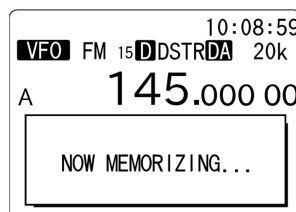
11-8　DATA ENTRY

Data entry can be made by the numeric keypad.

1 ABC	2 DEF	3 GHI
4 JKL	5 MN	6 OPQ
7 RST	8UVW	9 XYZ
. []|,	0 +-*/	

Following characters are available for data entry:

A ~ Z, 0 ~ 9, [,], _, |, ,, . , +, −, *, /, [SPACE]

Below characters/numbers are assigned to respective keypad:

1 ->	A B C 1	2 ->	D E F 2	3 ->	G H I 3
4 ->	J K L 4	5 ->	M N 5	6 ->	O P Q 6
7 ->	R S T 7	8 ->	U V W 8	9 ->	X Y Z 9
.☐	[ ] _	, .	0 ->	+ - * / SPACE 0		

Pressing the respective key will toggle between assigned characters.
    (Example: 1 key ->　　A-> B-> C-> 1-> A->…)

Press the [CLR] key to display characters in reverse order. (A-> B-> C-> 1-> A->…）

To delete one character, press the [▲] key.

To delete entire entry, press and hold the [▲] key for two seconds.

To change the position, rotate the dial knob. Rotating clockwise will move the cursor to the right and rotating the dial knob counterclockwise will move the cursor to the left.

11-9 DATA EDITOR

Data Editor function is used to copy or move the information in the search banks, memory banks or memory channels.

To access the data editor function, perform the following steps:

1. Press the [F] key and then the [8] key.

2. Following screen will appear.

```
┌─────────────────────────┐┌─────────────────────────┐┌─────────────────────────┐
│ DATA EDITOR        1/3  ││ DATA EDITOR        2/3  ││ DATA EDITOR        3/3  │
│ COPY SRBK               ││ COPY MEMBK              ││ COPY MEMCH              │
│        ▮00▮ => 01       ││        00 => ▮01▮       ││     00-00 => ▮00-01▮    │
│ MOVE SRBK               ││ MOVE MEMBK              ││ MOVE MEMCH              │
│        00  =>  00       ││        00 =>  00        ││     00-00 =>  00-00     │
│                         ││                         ││                         │
│ Cancel[CLR] SET[ENT]    ││ Cancel[CLR] SET[ENT]    ││ Cancel[CLR] SET[ENT]    │
└─────────────────────────┘└─────────────────────────┘└─────────────────────────┘
```

COPY SRBK	Copy search bank	MOVE SRBK	Move search bank
COPY MEMBK	Copy memory bank	MOVE MEMBK	Move memory bank
COPY MEMCH	Copy memory channel	MOVE MEMCH	Move memory channel

Left of the arrow: Original location

Right of the arrow: Destination

1. To select menu, press the [▼] or [▲] key.

2. Use the numeric keypad or rotate the dial knob to select the bank or channel number.

3. To confirm entry, press the [ENT] key.

12   SPECIFICATIONS

Frequency range:	100 kHz ~ 1300* MHz (Note: Specifications guaranteed above 530 kHz) (Cellular frequencies blocked for US consumer version)
Digital receive modes:	D-STAR (GMSK), ALINCO (GMSK), YAESU (C4FM), DIGITAL CR (C4FM), NXDN (C4FM), dPMR (C4FM), P25 (Phase 1) (C4FM), DMR (4FSK). (**)
Analog receive modes:	FM, AM, Synchronous AM (SAH, SAL), USB, LSB, CW
Receiver system:	100 KHz ~ 18 MHz : Direct conversion 18 MHz ~ 180 MHz: Double conversion super heterodyne (1st IF: 393 MHz, 2nd IF: 31.0 MHz) 180 MHz ~ 1300 MHz: Triple conversion super heterodyne (1st IF: 1705 MHz, 2nd IF: 393 MHz, 3rd IF: 31.0 MHz)
IF filter bandwidths:	200 Hz, 500 Hz, 1.8 kHz, 2.6 kHz, 3.8 kHz, 5.5 kHz, 6 kHz, 8 kHz, 15 kHz, 30 kHz, 100 kHz, 200 kHz
Receive assisted functions:	Auto notch, Noise reduction, Analog voice descrambler (not available for the US consumer version), AGC, Step adjust, Offset receive, Priority
Squelch modes:	Level squelch, Noise squelch, Voice squelch, Tone squelch, DCS
Frequency stability:	Less than +/- 2.5 ppm after warm-up (5 minutes)
Sensitivity:	530 KHz ~ 17.99999 MHz : 0.71 μV typ. (12dB SINAD) 18 MHz ~ 1300 MHz: 0.32 μV typ. (12dB SINAD)
Number of VFO's:	3
Memory channels:	2,000
Memory banks:	40
Search banks:	40
Priority channel:	1
Pass frequencies:	50 per bank or VFO
Audio outputs:	Internal speaker & speaker-out: min.1.0 W @ 8 Ohm, 12 V DC input. 10% THD. 3.5mm jacks for headphone, speaker-out and discriminator (FM only)
Recording/playback media:	SD/SDHC, 1 channel, 19 kHz sampling in wav format. Approx. 7 hours recording for 1 GB.
Timer functions:	Sleep timer 30, 60 90, 120 min., alarm and timer recording (once, daily, weekly)
PC connection:	Micro-USB for receiver control with command list.
Antenna input:	BNC, 50 Ohm
Max. antenna input level:	+0dBm
Power requirements:	10.8 ~ 16.0 V DC, approx. 750 mA (at 12V DC)
Operating temperature:	0 ~ 50 °C, 32 ~ 122 °F
Dimensions:	Approx. 178 mm (W) x 50 mm (H) x 215 mm (D) (proj.excl.) 7 (W) x 1.97 (H) x 8.46 (D) inches
Weight:	Approx. 1.5 kg (3lb 5oz)
Supplied accessories:	AC power adapter, Telescopic antenna, 4GB SDHC card, printed manual including command list. PC Software not supplied.

*Cellular frequencies blocked in the US.

Specifications are subject to change without notice or obligation.

Other company and product names mentioned in this document are the property of their respective owners.

Product and brand names used are for identification purposes only.

** <u>Digital voice mode compatibility chart:</u>

DIGITAL MODE	BANDWIDTH	MODE	VARIOUS	COMPATIBLE VOCODER	AR-DV1 VOICE DECODING
D-STAR	12.5kHz			AMBE	O
ALINCO DIGITAL	12.5kHz	EJ-47 (voice mode F1E)		AMBE	O
YAESU DIGITAL	12.5kHz	V/D mode		AMBE+2	O
	12.5kHz	Voice FR mode			X
DIGITAL CR	6.25kHz		NON-ENCRYPTED	AMBE+2	O
	6.25kHz		ENCRYPTED	AMBE+2	X
NXDN	6.25kHz	REGULAR MODE	NON-ENCRYPTED	AMBE+2	O
		REGULAR MODE	DIGITAL SCRAMBLING (15 BIT)	AMBE+2	O
			ENCRYPTED		X
			TRUNKING		X
	12.5kHz				X
DPMR	6.25kHz	dPMR446		AMBE+2	O
	6.25kHz	TIER 1		AMBE+2	O
		TIER 2			X
		TIER 3			X
P25	6.25kHz & 12.5kHz	PHASE 1	NON-ENCRYPTED	IMBE	O
		PHASE 1	ENCRYPTED		X
		PHASE 2			X
DMR	12.5kHz	TIER 1	NON-ENCRYPTED	AMBE+2	O
			ENCRYPTED	AMBE+2	X
		TIER 2	NON-ENCRYPTED	AMBE+2	O
			ENCRYPTED	AMBE+2	X
		TIER 3	TRUNKING	AMBE+2	X

For a worldwide directory of D-STAR repeater frequencies (classified by country and city), you may want to check the very informative D-Star Repeater Directory site at: http://dstarusers.org/repeaters.php

13 LIMITED WARRANTY (USA only)

AOR USA, Inc. (AOR) warrants its receivers as described below:

AOR will repair or exchange equipment as a result of defects in parts or workmanship for a period of one year from the date of original retail purchase from an authorized AOR dealer.

Exclusions

The following items are not covered by the AOR limited warranty:

1. Products that are damaged through accident, abuse, misuse, neglect, or user modifications.
2. Problems that arise through failure to follow directions in the owner's manual.
3. Exposure of the product to adverse or severe weather conditions, including lightening, temperature extremes or water, including rainfall or immersion.
4. Exposure to toxic materials, biohazards, radioactive materials or other contamination.
5. Repairs attempted by parties other than AOR or its authorized personnel.
6. Damage that results from improper installation, including improper voltage and/or reversed polarity, or exposure of a receiver to signal levels exceeding specifications.
7. Damage resulting through the use of accessories from manufacturers other than AOR.
8. Equipment that has had serial numbers removed or altered in any way.
9. Damage that occurred as a result of shipment. Claims must be presented to the carrier.
10. AOR is not responsible for any costs arising from installation or reinstallation of the equipment, nor for any consequential (such as loss of use) damage claims.

Obtaining Warranty Service

1. You are responsible for shipping the product to AOR and any related costs.
2. Warranty claim must be accompanied by a legible copy of the original product purchase receipt.
3. You must include a description of the problem(s) encountered with the product.
4. You must include your name, a valid ground shipping address (including zip code) and telephone contact information.
5. AOR will ship the repaired (or replaced) product by ground transport.

Limitations

Any and all implied warranties, including those pertaining to merchantability and utility for a specific purpose are limited to the duration of this limited warranty. AOR's limits on warranty pertain only to the repair or, at its option, replacement of defective products. AOR shall not be liable for any other damages, including consequential, incidental or otherwise, arising from any defect.

Some states do not allow limitations on how long an implied warranty lasts and may not allow the exclusion of incidental or consequential damages. As such, the above limitations may not apply in every case. This warranty gives you specific legal rights and you may have other rights that apply in your state.

If you have questions about this limited warranty, or the operation of your AOR product, contact AOR at (310) 787-8615 during normal business hours (9 am ~ 5 pm Pacific Time Zone), or write to AOR, 20655 S. Western Ave., Suite 112, Torrance, CA 90501. You may also send a fax to AOR at (310) 787-8619. Additional information is available at the AOR web site: www.aorusa.com

We suggest attaching your purchase receipt to this half of the warranty card and keeping this information in a secure location.

AOR Model Number _____

Serial Number _____

Dealer Name _____

Purchase Date _____