

AR5700D OPERATING MANUAL ADDENDUM:

Following replaces the description for DCR / NXDN page 33:

<i>DCR / NXDN 15 BIT SCRAMBLE CODE</i>	[FUNC] + [0]. Go to DCR CODE with [DOWN] key.	<p>Set the 5-digit number to decode a scrambled signal. 32767 possible combinations from 00001 to 32767.</p> <ul style="list-style-type: none"><li>• Use the sub-dial to select a value.</li><li>• [UP] or [DOWN] key to change selection.</li><li>• [PASS] to set to 00000 for no scramble code used.</li><li>• [ENT] to validate.</li></ul> <p>For scramble code auto detection, long press the [PASS] key. A star mark will appear. Press [ENT] twice to validate and quit this page.</p>
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Authority On Radio Communications



DIGITAL  
COMMUNICATIONS  
RECEIVER

**AR5700D**

OPERATING MANUAL

## INTRODUCTION

Thank you for purchasing the AR5700D.

AR5700D is a high-end table-top receiver with wide band coverage between 9kHz and 3.7GHz. It supports a variety of digital, as well as analog modes. Some of its outstanding features are:

**1) Digital signal processing:**

Input signals after the 45.05MHz IF are converted from analog to digital by a DSP processor. There is no AGC in the analog processing unit, as all processing, including AGC, is done by DSP.

**2) High-performance analog front-end:**

Analog signal processing is performed by a computer simulated, high-performance distribution constant filter.

**3) DDS local oscillator:**

Instead of the conventional PLL method, the first local frequency is produced by direct digital synthesis. That method allows frequency switching at high speed.

**4) IF output:**

An analog IF of 15MHz (+/-7.5MHz) bandwidth is output.

**5) Digital I/Q output:**

A digital I/Q signal of 0.9MHz is output via a USB 2.0 interface.

**6) High precision frequency reference:**

0.01ppm frequency stability of the 10MHz internal master oscillator is achieved when using the optional GPS receiver unit.

**7) FFT analyzer:**

Thanks to the onboard FFT processor, 10MHz wide spectrum data can be output at high speed via serial.

**8) Multi-mode digital voice demodulation:**

D-STAR, YAESU, ALINCO, D-CR, NXDN, P25, dPMR, DMR, Mototrbo, TETRA. (Mode dependent restrictions apply)

**9) Video demodulation**

By connecting an external TV monitor, it is possible to demodulate the signal of FM modulation security cameras and analog TV broadcasts. When you connect the TV monitor, you can check the demodulated video. Not compatible with digital terrestrial television.

**10) Simultaneous monitoring**

2 band reception, offset reception, triple reception (restrictions apply).

**11) SD card slot**

You can record the received audio, analog and decoded digital, as well as logs.

**12) 12kHz analog I/Q output**

Allows DRM broadcasts decoding via a PC and dedicated 3rd party software.

**13) HF direct sampling**

When receiving HF signals, the signals are converted directly to digital without entering the mixer. This allows very good linearity characteristics.

Please read this operating manual carefully. This information will allow you to enjoy maximum performance from your receiver. Due to continuous developments of the receiver, firmware and software, we acknowledge that there might be some changes, errors or omissions.

We sincerely hope that the AR5700D will be your monitoring companion for many years to come.

## SAFETY PRECAUTIONS

DO NOT operate the receiver near unshielded electrical blasting caps or in an explosive atmosphere. This could cause an explosion and death.

DO NOT operate the receiver with a headset or other audio accessories at high volume levels. If you experience a ringing in your ears, reduce the volume or discontinue use.

DO NOT directly apply AC power to the DC socket on the receiver rear panel. This could cause a fire or damage the receiver.

DO NOT apply more than 16 V to the DC socket on the receiver rear panel. This could cause a fire or damage the receiver.

DO NOT reverse the DC power cable polarity. This could cause a fire or damage the receiver.

DO NOT let metal, wire or other objects contact the inside of the receiver, or make incorrect contact with connectors on the rear panel. This could cause an electric shock or damage the receiver.

DO NOT operate or touch the receiver with wet hands. This could cause an electric shock or damage to the receiver.

Immediately turn OFF the receiver power and remove the power cable from the receiver if it emits an abnormal odor, sound or smoke. Contact your AOR dealer or distributor for advice.

DO NOT put the receiver on an unstable place where the receiver may suddenly move or fall. This could cause an injury or damage the receiver.

DO NOT operate the receiver during a lightning storm. It may result in an electric shock, cause a fire or damage the receiver. Always disconnect the power source and antenna before a storm.

DO NOT expose the receiver to rain, snow or any liquids.

DO NOT change the internal settings of the receiver. This could reduce receiver performance and / or damage the receiver. The receiver warranty does not cover any problems caused by unauthorized internal adjustments.

DO NOT install or place the receiver in a place without adequate ventilation.

DO NOT use harsh solvents such as Benzine or alcohol when cleaning, as they will damage the receiver surfaces.

DO NOT leave the receiver in areas with temperatures below 0°C or above +50°C.

DO NOT place the receiver in excessively dusty environments. This could damage the receiver.

DO NOT place the receiver against walls or put anything on top of the receiver. This may overheat the receiver. The receiver will become hot when operating the receiver continuously for long periods of time.

Turn OFF the receiver's power and / or disconnect the DC power cable when you will not use the receiver for a long period of time.

The display may have cosmetic imperfections that appear as small dark or light spots. This is not a malfunction or defect, but a normal characteristic of LCDs.

The AR5700D may receive its own oscillated frequency, resulting in no reception or only noise reception including on the spectrum displayed by control software, on some frequencies.

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## 1. SUPPLIED ITEMS

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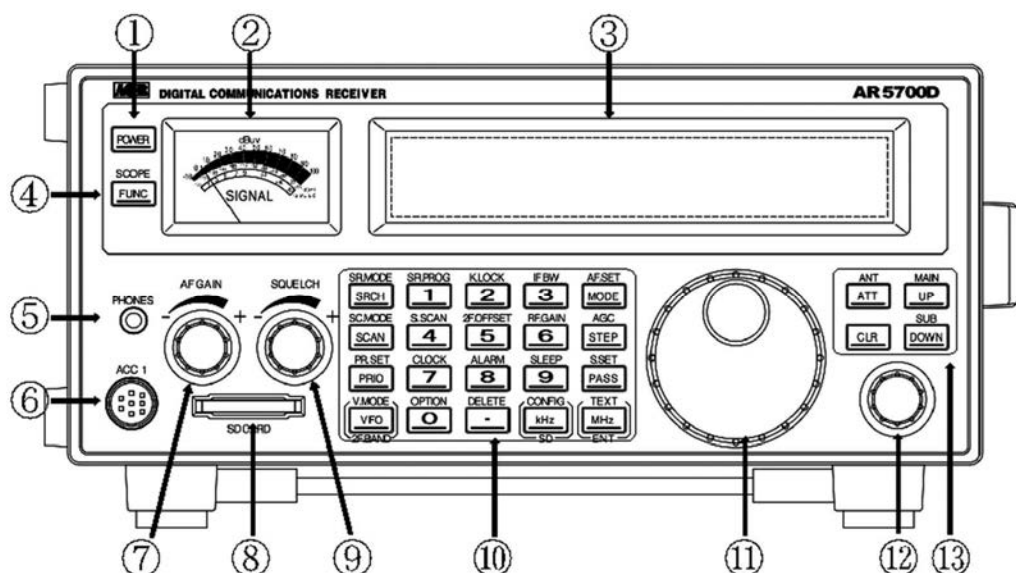
- AR5700D receiver \_\_\_\_\_ 1
- AC power adapter \_\_\_\_\_ 1
- Printed user manual \_\_\_\_\_ 1
- SD card \_\_\_\_\_ 1
- USB cables \_\_\_\_\_ 2
- AR-IQ-III license dongle \_\_\_\_\_ 1  
(also contains control software and USB driver)

A list of optional accessories is available at:

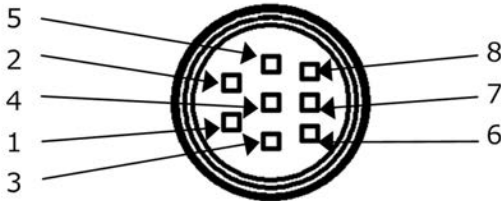
[http://www.aorja.com/accessories/receiver\\_accessories.html](http://www.aorja.com/accessories/receiver_accessories.html)

## 2. FRONT/REAR PANEL DESCRIPTION

### 2.1. Front panel



①	Power key	Press the switch briefly to turn the receiver ON. Press and hold it for 2 seconds to turn the receiver off. If you need to disconnect the AC power adapter, make sure that the receiver is shut down before.
②	Signal-meter	Indicates the received signal strength, measured at the antenna input, in S-units, dBm and dBuv. As it is measured at the antenna input, the displayed level does not change when the attenuator or AMP is used. However, this only applies when there is an actual steady signal received.
③	LCD display	Shows the tuned frequency and selected operation conditions.
④	Function key	Activates a key's or a dial's sub-function. It's usually a sub-function written over a key.
⑤	Headphone socket	Three pin 3.5mm, stereo output. For stereo broadcasts, use the FMST receive mode with 100kHz or 200kHz bandwidth. In dual-band reception, the main frequency is audible on the right channel, and the sub-frequency on the left channel.

⑥	Accessory socket 1 (The optional GP5001 GPS receiver unit connects here)	<div></div> <p>Pinout description.</p> <table><tr><td>1</td><td>12V DC output. No current limitation. Both voltage and amperage depend on power supply DC input.</td></tr><tr><td>2</td><td>Discriminator output Unfiltered audio limited to the NFM receive mode. 0.78V p-pEMF 10kΩ (NFM deviation 3kHz, audio 1kHz)</td></tr><tr><td>3</td><td>External mute input. Short this terminal to the ground to mute the receiver's audio output. Remember that this function does not protect the high frequency circuitry from strong nearby transmissions.</td></tr><tr><td>4,5</td><td>Control 1,2 When busy (squench is open) the control closes between 1 and 2 terminals. Uses non-polar photo MOS relays. Up to 350mA on-resistance 2Ω or less, load voltage 40V)</td></tr><tr><td>6</td><td>GPS time pulse input</td></tr><tr><td>7</td><td>Low level audio output (2.5mV@600Ω) Not affected by changes in AF GAIN.</td></tr><tr><td>8</td><td>Ground</td></tr></table>	1	12V DC output. No current limitation. Both voltage and amperage depend on power supply DC input.	2	Discriminator output Unfiltered audio limited to the NFM receive mode. 0.78V p-pEMF 10kΩ (NFM deviation 3kHz, audio 1kHz)	3	External mute input. Short this terminal to the ground to mute the receiver's audio output. Remember that this function does not protect the high frequency circuitry from strong nearby transmissions.	4,5	Control 1,2 When busy (squench is open) the control closes between 1 and 2 terminals. Uses non-polar photo MOS relays. Up to 350mA on-resistance 2Ω or less, load voltage 40V)	6	GPS time pulse input	7	Low level audio output (2.5mV@600Ω) Not affected by changes in AF GAIN.	8	Ground
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⑦	AF GAIN knob	Volume control. Turn clockwise to increase volume, counter-clockwise to decrease.														
⑧	SD card slot	Standard size SD Card Connector You can record and playback received audio, backup and restore memory data and receiver settings. Insert the surface of the SD card until it locks upwards. For microSD cards, use an SD card adapter.														
⑨	Squelch knob	Adjust the squelch level to eliminate noise when there is no signal received.														
⑩	Numeric keypad	To input frequencies, various values and access numerous functions.														
⑪	Main dial	Tunes the frequency up and down and toggles memory channels.														
⑫	Sub-dial	In VFO mode, tunes the frequency up and down. In SEARCH/SCAN modes, switches memory banks. Else, it selects various content on screen.														
⑬	Sub-keypad	Used to access sub-functions.														



## LCD DISPLAY

### ▪ Frequency display



Note: The LCD's display speed might slow down with lower temperatures, it does not represent a malfunction.

	Indicates that the FUNC key has been pressed. All keys have now their sub-function (written over the key) activated when pressed.
	Offset function activated. Two offset frequencies are now received, main frequency + sub-frequency within +/-5MHz from main frequency. Above 25MHz only.
	2 band reception activated. One frequency below and one above 25MHz.
 or 	GPS status (option) for frequency accuracy. Indicator on: 0.01ppm, flashing: better than 0.1ppm, off: 0.1ppm (=no GPS signal) (Depending on the quality of the GPS signal, it can take some time for the icon to appear, and up to 30 minutes to go from flashing to constant on indicator) Indicates that a 10MHz external reference signal has been applied.
	Indicates that KEY-LOCK has been activated, or that remote control is taking place. When enabled, all controls except AF GAIN and POWER will be disabled. Press CLR to deactivate.
<b>ALARM</b>	Alarm function is active.
<b>SLEEP</b>	Sleep function is active
<b>SD REC</b> or	SD: An SD card has been detected. REC : Audio recording ongoing.
<b>PRIO</b>	Priority receive function activated.
<b>ANT:1</b>	Displays the antenna terminal in use. "P" means as programmed.
	Squelch level bar indicator Volume level bar indicator
	Busy (Squelch is open)
<b>65.3dBu</b> <b>- 47.1dBm</b>	S-meter value, in dBm or dBu units. Indicates the received signal strength. As it is measured at the antenna input, the displayed level does not change when the attenuator or AMP is used. However, this only applies when there is an actual steady signal received.

<b>ATT(A):0dB</b>	Attenuator level indicator in dB. (A) means that attenuator is set to AUTO.
<b>AMP</b>	The RF amplifier is activated.
<b>AUTO</b>	The (analog) auto-receive mode function is activated.
<b>ST:025.000k</b>	Currently selected frequency step value.
<b>L-BANK</b>	The bank link function is activated.
<b>VFO MEM SCAN SRCH CYBER S. SCAN V. SRCH</b>	Currently selected operation mode.
<b>PAUSE</b>	Displayed when a SEARCH or SCAN is paused.
<b>UCS</b> or <b>VID</b>	Voice scan is activated  Analog video output is enabled.
<b>PASS</b>	Pass frequency function is enabled.
<b>AS-M</b>	Auto-store function is enabled.
<b>DCS</b>	DCS function is enabled. DCS code also displayed when detected.
<b>TONE</b>	TONE function is enabled. CTCSS frequency also displayed when detected.
<b>STEP-ADJ</b>	Step-adjust function is enabled.
<b>3700000000 145000000</b>	Tuned frequency. MHZ, kHz and Hz blocks are in different sizes for easier reading.
<b>==</b>	AGC function set to off.
<b>00</b> (at the right of frequency)	Search group and scan group number.
<b>BW 100k</b>	IF bandwidth
<b>FM</b> (black font) <b>000</b> (white font)	Currently selected receive mode.  Currently received digital mode.
<b>VA00SRHF</b>	VFO letter, bank, channel and search bank number.

## ▪ Digital signal info display



Receive mode	Indication examples	Description
DCR	CODE:NO UC:100	CODE: NO (The signal is unscrambled) UC: 100 (The user code is 100)
	CODE:00007 UC:100	CODE:00007 (The 15-bit scramble code is 00007) UC: 100 (The user code is 100)
DCR (for NXDN)	CODE:NO RAN:00	CODE: NO (The signal is unscrambled) RAN:00 (The Radio Access Number is 00)
	CODE:00012 RAN:33	CODE:00012 (The 15-bit scramble code is 00012) RAN:33 (The Radio Access Number is 33)
DMR	SLOT:1 COL:01	DMR slot is 1 DMR color code is 1
P25	NAC:293	The Network Access Code is 293
DSTAR	CAL:JA0000 RPT:DIRECT	The sender's call sign is JA0000 Repeater call sign, or direct communication
T-TC	SLOT:1	TETRA's traffic channel's slot number

Note: There is no signal info display function for other digital modes.

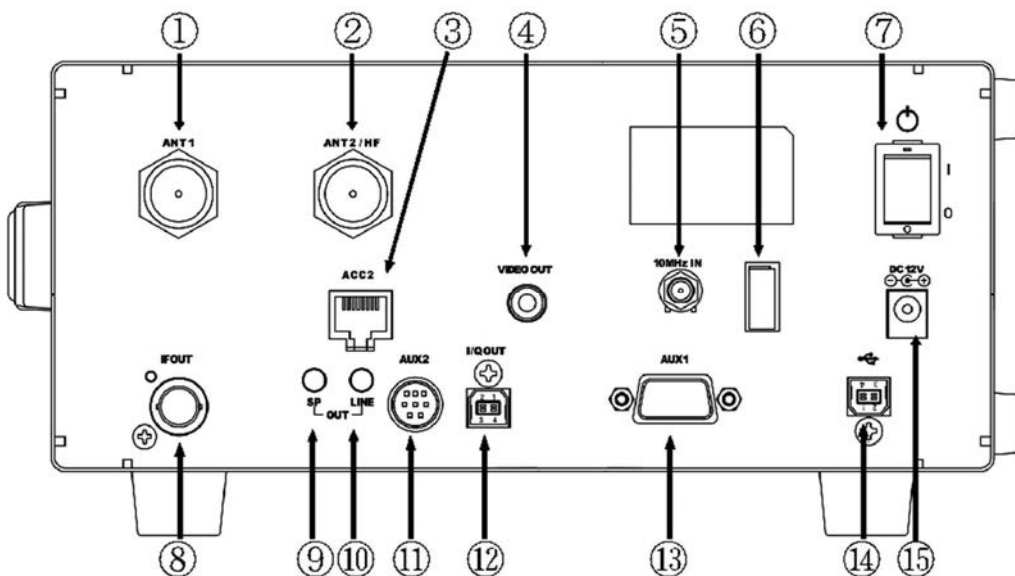
## ▪ Spectrum display



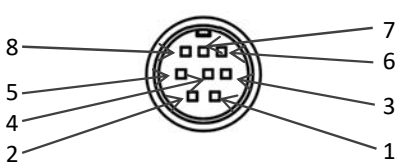
Long-press of [FUNC] to activate or deactivate.

	Upper: Squelch level Lower: Volume level
	BUSY for when the squelch is open
	Function key has been pressed. Activates the sub-function of the next key to be pressed.
VA	Currently selected VFO (from A to E)
FM	Receive mode
200k	IF filter bandwidth
SPAN:10.0M	Displayed spectrum bandwidth
91.900000M	Center frequency in MHz
71.0dBm	Signal level of the center frequency

## 2.2. Rear panel



①	ANT 1	Type N socket (50Ω) for frequencies over 25MHz only.
②	ANT2/HF	Type N socket (50Ω) for all frequencies, including HF.
③	ACC2	Socket to connect the optional antenna selector unit. <u>Do not connect to a LAN network!</u> Not compatible with AS5001 Antenna selector unit.
④	VIDEO OUT	RCA type socket (75Ω 1 V p-p) to output the image of a demodulated analog video signal.
⑤	10MHz IN	SMA type socket (50Ω) External reference clock input of 10MHz (2dBm±2dB). When a valid 10MHz is entered, it automatically switches to that external input.
⑥	Power cable clamp	Secure the DC cable with this clamp to avoid the DC connector to be pulled out accidentally.
⑦	Power switch	Receiver's main power switch.
⑧	IF OUT	BNC type socket (50Ω) Outputs analog IF at 45.05MHz with a bandwidth of +/- 7.5MHz. (Output level is +10dBm relative to antenna input)
⑨	SP OUT	Ø3.5mm monaural jack (Up to 2W with 8Ω load) To connect to an external speaker.
⑩	LINE OUT	Ø3.5mm stereo jack (600Ω -10dBm) To connect to an external recording device, or an audio amplifier. Can be switched to output a 12kHz wide analog I/Q signal. In dual-band reception, the main frequency is audible at the right side and the sub-frequency at the left side.

⑪	AUX2 (not compatible with the GP5001 GPS antenna unit) For future applications.	<p>Mini-DIN-8 socket</p>  <table><tr><td>1</td><td>GPS TXD</td></tr><tr><td>2</td><td>GPS 1Hz Pulse</td></tr><tr><td>3</td><td>12V</td></tr><tr><td>4</td><td>GND</td></tr><tr><td>5</td><td>GPS RXD</td></tr><tr><td>6</td><td>RTS</td></tr><tr><td>7</td><td>CTS</td></tr><tr><td>8</td><td>NC</td></tr></table>	1	GPS TXD	2	GPS 1Hz Pulse	3	12V	4	GND	5	GPS RXD	6	RTS	7	CTS	8	NC
1	GPS TXD																	
2	GPS 1Hz Pulse																	
3	12V																	
4	GND																	
5	GPS RXD																	
6	RTS																	
7	CTS																	
8	NC																	
⑫	I/Q OUT	USB type B socket which outputs digital I/Q data (bandwidth 0.9MHz) for PC.																
⑬	AUX1	D-SUB 9 male socket for receiver serial control or to connect the optional Ethernet Controller unit.																
⑭	USB socket	USB Type B socket for receiver control by PC.																
⑮	DC 12V	DC barrel socket (5.5/2.1mm), center positive, for power input. DC10.7V~16V (2.0A@12V).																

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### 3. BASIC OPERATION

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#### 3.1 Connecting power

Connect the supplied AC power adapter. If using another power supply, make sure it provides DC10.7V~16V with at least 2 A of power.

#### 3.2 Power on/off

First, set the power switch located at the back of the receiver to ON. The receiver will enter in standby mode and the display will show the clock as follows.



Then press the front panel's POWER key. This opening screen will briefly appear, followed by the standard operation screen.



To put the receiver back into standby mode, press and hold the POWER key. After that, if you wish to completely power off the receiver, set the power switch at the back of the receiver to OFF.

\*If you wish to set the clock and the band-plan region now, see chapter 11.

#### 3.3 Connecting and selecting an antenna

AR5700D has two type N (50Ω) antenna sockets, labeled ANT 1 and ANT 2/HF. Although that applies for a standard “stand-alone” receiver operation, please note that the frequency/antenna allocations are reversed when using the IF output, or when the receiver is controlled via the AR-IQ-III software.

Rules are as follows:

	Stand-alone (AF)	IF output	I/Q output
ANT 1	25MHz-3.7GHz	9kHz-3.7GHz	9kHz-3.7GHz
ANT 2	9kHz-3.7GHz	25MHz-3.7GHz	25MHz-3.7GHz

Selected antenna number



### To select an antenna input:

1. Press [FUNC] + [ATT].
2. Rotating the sub-dial, chose between ANT:1, ANT:2, ANT:3, ANT:4 and ANT:PRG.
3. Validate with [ENT].

Note: ANT:3 and ANT:4 are only accessible with the optional antenna selector unit. ANT:PRG selects the antenna input which has been previously registered for this particular frequency. If there is no registration, ANT:1 is used by default.

## 3.4 Volume

When starting the receiver for the first time, or after a system reset, volume level is set to zero. Using the AFGAIN knob, increase the volume up to a comfortable level.

## 3.5 Frequency input

- Enter the frequency via the numeric keypad, followed by the [kHz] key or the [MHz] key.



Example for 91.9MHz



Example for 1310kHz

Alternatively, you can select the frequency by rotating the main dial or the sub-dial. The frequency will be incremented by the set frequency step value (ST on the screen).

AR5700D has five different VFOs from A to E, identified as VA to VE at the bottom right of the screen.

A VFO does not only contain a frequency, but also the receive mode, IF filter bandwidth, tuning step and attenuator settings associated to the frequency.

### ● To cycle through the five VFOs:

Press the [VFO] key until the desired VFO letter is displayed.



● **To copy the current VFO to another VFO:**

1. Long press [ENT]

```
144.200000MHz
MEM SET      VFO COPY(Press[.])
BANK:00
CH  :00      ----.-----
```

2. Press [.]

```
VFO COPY      VFO-C -> [2]:B
144200000     [3]:C
               [4]:D
               [5]:E
```

3. Select the destination VFO by rotating the sub-dial.
4. Press [ENT] (You are now tuned to the destination VFO)

### **3.6 Receive mode and IF filter bandwidth**

Following receive mode and IF bandwidth combinations are available:

MODE	IF FILTER BANDWIDTH	REMARKS
<b>WFM1(IF100k)</b>	100k	Reception frequency 25MHz or higher
<b>WFM2(IF200k)</b>	200k	Reception frequency 25MHz or higher
<b>FMST(IF200k)</b>	200k	Reception frequency 25MHz or higher
<b>NFM(IF15k)</b>	15k	Reception frequency 25MHz or higher
<b>SFM(IF6k)</b>	6k	Reception frequency 25MHz or higher
<b>WAM(IF15k)</b>	15k	
<b>AM(IF6k)</b>	6k	
<b>NAM(IF3k)</b>	3k	
<b>SAM(IF6k)</b>	6k	
<b>USB(IF3k)</b>	3k	
<b>LSB(IF3k)</b>	3k	
<b>CW1(IF500)</b>	500	
<b>CW2(IF200)</b>	200	Reception frequency 25MHz or higher
<b>AIQ(IF15k)</b>	15k	
<b>FM</b>	3k, 6k, 15k, 30k, 100k, 200k	Reception frequency 25MHz or higher
<b>FMST</b>	100k, 200k	Reception frequency 25MHz or higher
<b>AM</b>	3k, 6k, 15k, 30k	Reception frequency lower than 25MHz
	1k, 3k, 6k, 15k, 30k	Reception frequency 25MHz or higher
<b>SAM</b>	3k, 6k, 15k, 30k	Reception frequency lower than 25MHz
	1k, 3k, 6k, 15k, 30k	Reception frequency 25MHz or higher



USB	3k, 6k, 15k, 30k	
LSB	3k, 6k, 15k, 30k	
CW	500	Reception frequency lower than 25MHz
	200, 500	Reception frequency 25MHz or higher
AIQ	3k, 6k, 15k, 30k	
AUTO		According to band plan and region setting. For analog modes only.
DALL	Set automatically. Non changeable.	Reception frequency 25MHz or higher. For digital modes only. TETRA (T-DM, T-TC) are excluded.
DCR (= NXDN)	Set automatically. Non changeable.	Reception frequency 25MHz or higher
dPMR	Set automatically. Non changeable.	Reception frequency 25MHz or higher
DMR	Set automatically. Non changeable.	Reception frequency 25MHz or higher
P25	Set automatically. Non changeable.	Reception frequency 25MHz or higher
DSTAR	Set automatically. Non changeable.	Reception frequency 25MHz or higher
YAESU	Set automatically. Non changeable.	Reception frequency 25MHz or higher
EJ-47 (Alinco)	Set automatically. Non changeable.	Reception frequency 25MHz or higher
T-DM (Tetra direct mode)	Set automatically. Non changeable.	Reception frequency 25MHz or higher
T-TC (Tetra traffic channel)	Set automatically. Non changeable.	Reception frequency 25MHz or higher

● **To select a receive mode:**

1. Press [MODE].
2. Rotate the sub-dial until the desired mode is displayed.
3. Validate with [ENT].

The most common modes are also available with a preset IF filter bandwidth in parenthesis, as in the illustration below.

MODE: WFM2( IF200k )

● **To change the IF filter bandwidth:**

1. Press [FUNC] + [3].
2. Rotate the sub-dial until the desired bandwidth is displayed.
3. Validate with [ENT].

Analog AUTO mode selected. Receive mode, IF bandwidth and frequency step are automatically selected depending on the frequency and the set region (US, Japan or Europe) .



## 3.7 Squelch

- The squelch function quiets the background “white” radio noise, when no signal is present. It operates in the analog modes and the digital auto mode (DALL). It has no effect for the individual digital modes as the receiver only lets audio pass through when a digital signal is detected.
  - The squelch can be manually “opened” and allow signals to be heard, or “closed” to mute the audio of the signal.
  - When the squelch is “open”, the indicator [B] (for busy) appears on the left side of the LCD.
  - When doing a memory SCAN or SEARCH, the squelch setting is very important as it serves as a receiver signal threshold to determine whether or not a signal is present, and when to resume scanning.
- **Squelch is adjusted as follows:**
1. Tune to a desired frequency where white noise is occasionally interrupted by a signal.
  2. While white noise is audible, rotate the SQUELCH knob to set the squelch threshold so that the receiver is just silenced. The squelch is now “closed” and no audio is heard. With the squelch level properly set, audio will only be heard when there is an actual signal.

In addition to the classic “signal level” squelch, AR5700D also features “noise” squelch and “voice” squelch. See the ADVANCED FUNCTIONS chapter about how to activate these particular squelch modes.

## 3.8 Tuning step

- A tuning step is the rate the frequency will be incremented per click when rotating the main dial or the sub dial.
- When the receive mode is set to AUTO, the step value is automatically set depending on the frequency and the set region (US, Japan or Europe).

The tuning step can be set manually in two ways:

● **Setting via the dial**

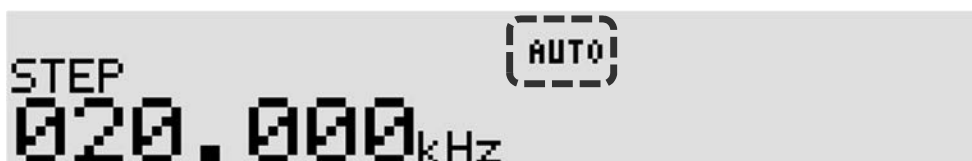
1. Press the [STEP] key.
2. Rotate the sub dial to select the desired step.

Following preset step values are available:

0.001, 0.010, 0.050, 0.100, 0.500, 1.000, 5.000, 6.250, 9.000, 10.000,  
12.500, 20.000, 25.000, 30.000, 50.000, 100.000, 500.000 kHz

3. Validate with [ENT].

Displayed when the receive mode is set to AUTO.



● **Setting via the numeric keypad**

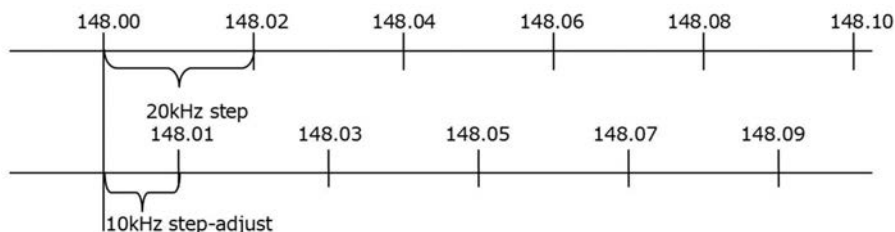
Let's say you want to input 20kHz:

1. Press [STEP].
2. Press [2] + [0] + [kHz].
3. Validate with [ENT].

## 3.9 Step-adjust

This function is useful when the array of desired receiver frequencies is not compatible with the default step frequency. Step-adjust allows setting the frequency steps accordingly.

The following example describes a situation where a 20kHz step needs to be shifted by 10kHz.



### ● How to set step-adjust

Let's say we want a 20kHz step to start at 148.01MHz:

1. Dial 148.01 with the numerical keys, followed by [MHz].
  2. Press [STEP].
  3. Select 20kHz with the sub-dial. (You can also input nonstandard steps via the numerical keys)
  4. Press [PASS].
- [ \* ] will be displayed



5. Validate with [ENT].
  - o [STEP-ADJ] will appear on the main screen as follows:



You can tune to the frequencies incremented by the step-adjust value by either rotating the main dial, or using the UP and DOWN keys.

---

## 4. AUDIO RECORDING

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- The received audio can be recorded on a SD card and played back with the receiver.
- When an SD card is inserted, the receiver might take more or less time to read the card's content, depending on the size of the card.
- Once the card is ready for operation, the SD icon will appear at the top of the screen.
- For a 16GB card it can take about half a minute until the icon appears, so please be patient.

### 4.1 File format

- Compatible SD card: Standard size SDHC up to 32GB, formatted in either FAT or FAT 32.
- Audio recording format: WAV audio, Microsoft PCM, 16 bit mono, 17578kHz.
- The resulting file names have 8 numerical digits, for ex. 00000001.wav.
- Each new recording has a file number incremented by 1. For ex. 00000001.wav will be followed by 00000002.wav.
- The wav recordings can also be played back using audio playback software of most operating systems. However, the computer must have an SD card reader.

Note: Logs of audio recordings are also written into the wav file, however those logs cannot be accessed via the receiver. You need to use a dedicated LOGEXTRACT PC utility to access the logs, playback related audio files on your PC and save export the logs in CSV format. Details at [www.aor.co.jp/receiver/product/ar5700d/](http://www.aor.co.jp/receiver/product/ar5700d/)

### 4.2 Recording duration

- Approx. 8h of continuous recording per 1GB, or 2MB per minute.
- If the SD card is out of space and you try to start a recording, a SD FULL message will be displayed on screen.

### 4.3 Recording start/stop

1. Insert an SD card into the [SDCARD] slot. Wait until the SD icon appears on top of the screen.
2. Press [kHz] to start the recording. The SD icon will change to REC .
3. Press [CLR] to stop the recording. The receiver will need a couple of seconds to finalize the file on SD. It is done when the REC icon reverts to SD. Do not attempt to remove the SD card before the SD icon appears, or the recording file will be corrupted.

### 4.4 Playback

Audio which has been recorded with the AR5700D can be played back directly via the receiver.

1. Press [kHz] to access the recording list page.
2. Use the [UP] and [DOWN] keys to highlight the file to be played back.  
In case of many recordings, browse through pages with the sub-dial.
3. Press [ENT] to play the file.
4. Press [CLR] to stop the playback.
5. Press [CLR] again to leave this page.

<[SUB -]		PAGE 0	[SUB +]>
00000001. WAV	00:00:08.3	2019/06/25	14:39:00
00000002. WAV	00:00:13.0	2019/06/25	14:39:30
00000003. WAV	00:00:09.3	2019/06/25	14:40:02
00000004. WAV	00:00:11.1	2019/06/25	14:42:42

File names                      Recording durations                      Time stamp of recording end

## **4.5 Skip blanks**

The SQL SKIP function removes blank spaces in the recording. When activated, the recording is paused when the squelch is closed (the recording file does not increase in size) and audio is only recorded when the squelch is open.

1. Press [FUNC] + [kHz]
2. Press the [DOWN] key until SQL SKIP is highlighted.
3. Press [ENT]
4. Toggle between ON and OFF with the sub-dial.
5. Validate with [ENT]

## **4.6 Rename files**

The audio recording files can be renamed using the receiver front panel. File names are limited to 8 ASCII characters.

1. Press [kHz] to access the recording file list.
2. Press the [DOWN] key until your desired file is highlighted.
3. Long press [MHz] to edit the file name.  
The selected digit is underlined.
4. Use the sub-dial to toggle between numbers and letters. Spaces are invalid.
5. Go to the next digit with the [UP] key. [DOWN] key for previous digit.  
The selected digit can be erased with the [PASS] key.  
You can insert a new digit by pressing the [.] key.
6. Press [ENT] to validate.



## **4.7 Delete files**

1. Press [kHz] to access the recording list page.
2. Use the [UP] and [DOWN] keys to highlight the file to be deleted.  
In case of many recordings, browse through pages with the sub-dial.
3. Press [FUNC] + [.] to delete the file.
4. Confirm the delete request with the [MHz] key.
5. Press [CLR] to leave this page.

## **4.8 SD card formatting**

**Formatting the SD card will destroy all its data!**

1. Press [FUNC] + [kHz]
2. Go to SD FORMAT with the [DOWN] key.
3. Press [ENT]
4. Press the [MHz] key to start the formatting (FAT32), or the [CLR] key to cancel.

## 5. MEMORY CHANNEL & SCAN OPERATIONS

- AR5700D can store 2000 memory channels, divided into 40 banks of 50 memory channels each.
- Frequencies can be conveniently stored into “memory channels”, along with the receive mode, IF bandwidth, etc.
- Frequently used groups of frequencies can be stored into “memory banks”, which can be scanned either individually or in a group of linked banks.
- The SCAN function continuously searches through the memory channels registered into a memory bank, then stops or pauses when an active signal is detected.
- Memory channels are numbered from 00 to 49.
- Memory banks are numbered from 00 to 39.
- Scan groups are numbered from 0 to 19.
- It is crucial to correctly set the SQUELCH level for the scan function to operate. To set the squelch, tune the receiver to an inactive frequency, then increase the squelch level just up to the point where noise is muted. The squelch should open only when a signal is active on the frequency.

### 5.1 Save a frequency into a memory channel

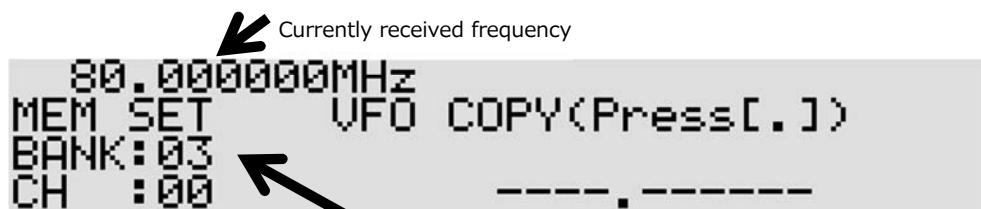
Frequencies can be conveniently stored into “memory channels” along with the receive mode, IF bandwidth, name tag and ATT setting.

#### ● To save a frequency into memory (fast way):

1. Tune to the desired frequency and set the correct receive mode and IF bandwidth.
2. Long press the [ENT] key to access the memory channel registration page.
  - The next available memory bank and channel numbers will be automatically assigned. If this is the first time a frequency is saved into a memory channel, it will be BANK:00 and CH:00.
  - If you do not wish to assign a channel name at this point, continue and save settings as follows:
3. Press [ENT] twice.

#### ● To save a frequency into a specific memory channel (with name tag):

1. Tune to the desired frequency and set the correct receive mode and IF bandwidth.
2. Long press the [ENT] key to access the memory channel registration page.
3. Select the bank number by rotating the sub-dial (or direct input via numerical keys).
4. Select the channel number by rotating the main dial (or direct input via numerical keys)
5. Press [ENT] to access the name tag page.
6. Select the first letter by rotating the sub-dial.
7. Go to the next digit by pressing the [UP] key.
  - To go to the previous digit, press the [DOWN] key.
  - To erase a selected digit, press [PASS].
  - To insert a blank space, press the [.] key.
- To save your name tag entry and leave this page, press [ENT].



If none, then 「-----」

- **To erase a single memory channel:**

1. Press [SCAN]
2. Select the bank number by rotating the sub-dial (or direct input via numerical keys).
3. Select the channel number by rotating the main dial (or direct input via numerical keys)
4. [FUNC] + [.]
5. [MHz]

- **To erase all channels in a memory bank:**

1. Press [FUNC] + long press on [.] (DEL MEM-CH is highlighted)
2. Select the bank number by rotating the sub-dial. (Banks with content are marked \*\*. Banks without content are marked -.)
3. Press [PASS]
4. Press [ENT]

## 5.2 Scan a memory bank

The scan mode searches the memory channels that have been previously registered in one or more memory banks, for active channels.

It is crucial to correctly set the squelch level for the scan to function to operate. To set the squelch, tune the receiver to an inactive frequency, then increase the squelch level just up to the point where the noise is muted. The squelch should open only when a signal is active on the frequency.

1. Open the squelch fully.
2. Press [SCAN] twice to enter the memory bank scan mode.
3. Select the bank number to scan with the sub-dial. Check the far right of the screen for the currently selected bank number BANK XX.
4. Slowly turn the SQUELCH knob clockwise until scan starts.
  - If scan stops on an inactive frequency (white noise), it means that the squelch level needs to be increased.
  - Scan direction can be changed with the [UP] and [DOWN] keys.
  - To force scan to resume (even though it stopped on an active frequency) turn the main dial slightly.
  - Pressing [ENT] while scanning stopped on a signal will copy that frequency to VFO-C and switch to that VFO
  - When scan has stopped on an active frequency of interest, you can temporarily switch to memory channel browser mode by pressing [SCAN] twice.
5. To quit the scan mode, press [SCAN].

## 5.3 Scan pass

The scan pass function may be marked as a memory channel to be ignored during scan. This is useful to temporarily disable memory channels, without having to erase them.

For example, while scanning, if scan has stopped on an active signal, but you want to bypass this frequency for future scans. While scan is stopped on that frequency (memory channel), proceed as follows:

- Press the [PASS] key. The PASS icon will be displayed on screen. Scan will now ignore this frequency.



- **To disable PASS for a particular frequency:**

1. Press [SCAN] to enter the memory browser mode. MEM will be displayed at the left of the screen.
2. Select the scan bank number with the sub-dial.
3. Select the memory channel with the main dial. For memory channels which have been previously assigned to

4. PASS, a PASS icon will be displayed at the top left corner of the frequency.
4. Press [PASS] to disable PASS. The icon will be off.

- **To erase all scan pass frequencies for a given bank number:**

1. Press [FUNC] followed by a long press on [.]
2. Press the [DOWN] key until DEL M-PASS is highlighted.
3. Select the bank number using the sub-dial. Banks marked with \*\* below the bank number do contain pass frequencies. Banks marked with – have no pass frequencies.
4. Press [PASS] to erase.
5. Press [ENT] to leave this screen.



## 5.4 Browse memory banks/channels

Memory channels already programmed with saved frequencies can be manually browsed and received as follows:

1. Press [SCAN] to enter the memory channel browser mode, marked MEM at the far left of the screen.
2. Select the memory bank number with the sub-dial.
3. Browse through and tune to each registered memory channel of that bank number, by rotating the main dial.
- Pressing [ENT] while browsing will copy the current frequency to VFO-C and switch to that VFO.



## 5.5 Select scan

This function allows you to “tag” up to 100 of all the registered memory channels (cross-banks), to form a separate “select scan” list.

- **How to tag a memory channel:**

1. Press [SCAN] to enter the memory channel browser mode, marked MEM at the far left of the screen.
2. Select the memory bank number with the sub-dial.
3. Select the memory channel number, by rotating the main dial.
4. Press [FUNC] + [PASS] to tag this frequency. An “S” will appear at the left of the bank number.
- Press [FUNC] + [PASS] again if you wish to remove the tag.

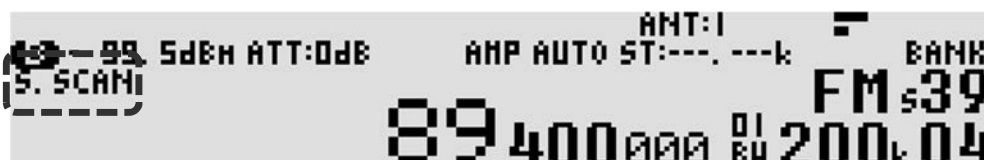




Note: You can also tag a memory channel while in SCAN mode in the same way, while scan has stopped on a frequency.

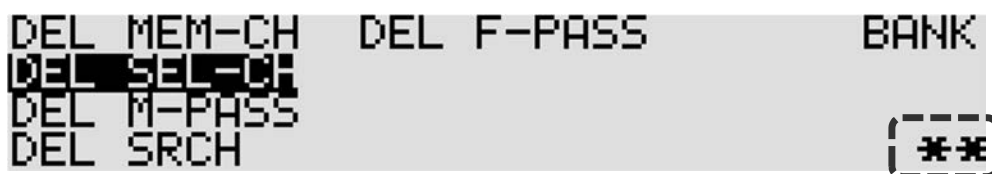
- **How to start a select scan:**

- Press [FUNC] + [4]. S.SCAN will be displayed at the left of the screen.  
Don't forget to properly set the squelch level, otherwise the select scan will not move to the next frequency.



- **How to delete all select scan tags:**

1. Press [FUNC] + long press on [.]
2. Use the [DOWN] key to highlight DEL SEL-CH.
3. Press [PASS]. At the bottom right of the screen, the \*\* mark has now changed to - - to indicate that the select scan list is now empty.
4. Press [ENT] to leave this screen.



## **5.6 Display memory channel name tags**

While browsing or scanning memory channels, you can choose whether or not to display the name tag for each memory channel.

- Press [FUNC] + [MHz]. Only the name tag will be displayed.
- Press [FUNC] + [MHz] again. Both the name tag and the frequency will be displayed.
- Press [FUNC] + [MHz] again to return to default: Only the frequency is displayed.

## **5.7 Create a group of linked memory banks**

There are 20 scan groups (numbered 0 to 19) that may be set up individually to scan a group of linked memory banks. Each scan group can be setup with its own squelch behavior as follows:

**PAUSE**, is the time after which scanning will resume, whether or not the signal is interrupted.

**DELAY**, is the pause length after the signal drops until the squelch closes and scan resumes.

- **Create a scan group:**

1. Press [FUNC] + [SCAN].
2. Assign a scan group number between 0 and 19 by rotating the sub-dial.
3. Press [PASS] to enable this scan group. LINK:OFF will change to LINK:ON.
4. Using the numerical keys enter the memory bank number to be linked. Caution is needed here as you need first to move the cursor to the correct line. For example, to link banks 12, 13 and 14:
5. Press [.] to move the cursor to the second line.
6. Enter only the second digit of the desired bank, that is 2 for bank 12.
7. Press [.] to move the cursor to the second line.

8. Enter only the second digit of the desired bank, that is 3 for bank 13.
9. Press [.] to move the cursor to the second line.
10. Enter only the second digit of the desired bank, that is 4 for bank 14.
11. Press [ENT] to validate.

Line 0 to 9	Cursor →	-- -- -- -- -- -- -- -- --	SCAN GRP: 0
Line 10 to 19		-- -- 12 13 14 -- -- -- --	
Line 20 to 29		-- -- -- -- -- -- -- -- --	LINK: OFF
Line 30 to 39		-- -- -- -- -- -- -- -- --	

- **Setting up squelch behavior for each scan group:**

1. From the previous screen, press the [DOWN] key to access the squelch behavior screen as below:

SCAN GRP: 0	
PAUSE: 4	VOICE: OFF
DELAY: 2.0	MODE SCAN: ALL

2. Toggle through each parameter via the [DOWN] key.
3. Change values by rotating the sub-dial.
4. Press [ENT] when you are done with all parameters.

- **Squelch behavior parameters description:**

**PAUSE:**

Time after which scanning will resume, whether or not the signal is interrupted. Possible values are OFF or from 1 to 60 seconds.

**DELAY:**

Pause length after the signal drops until the squelch closes and scan resumes. Possible values are OFF or from 0.1 to 9.9 seconds.

**VOICE:**

Scan will stop on an active signal only if “voice” sound is detected. Possible values are OFF or from detection level 1 to 7.

**MODE SCAN:**

This determines whether all specified memory channels will be scanned or only those of a certain receive mode. Possible selections are: ALL, FM, FMST, AM, SAM, USB, LSB, CW, AIQ, DALL, DCR, dPMR, DMR, P25, DSTAR, YAESU, EJ-47, T-DM, T-TC.

## **5.8 Scan a group of linked memory banks**

- **Select the scan group of the linked memory banks to be scanned:**

1. Press [FUNC] + [SCAN].
2. Select the SCAN GROUP number by rotating the dial.
3. If LINK is not set to ON for this scan group, press the [PASS] key to do so.
4. Validate with [ENT].

- **Start scanning this group:**

- Press [SCAN] twice to start the scan. L-BANK will be displayed at the far right of the screen indicating that this function is activated.
- Don't forget to set the squelch level correctly, otherwise scan will not start.

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## 6. PRIORITY RECEPTION

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- The priority feature permits checking for activity on one of the 2000 memory channels, while the AR5700D continues scanning, searching or monitoring. The receiver is momentarily tuned to the priority channel frequency to listen for any signal. If activity is found, the AR5700D will remain on the active frequency until the signal disappears. If no activity is detected, the receiver returns to the original VFO frequency, scan channel or search bank.
  - The priority function has a large number of applications and is particularly useful for monitoring a distress frequency while scanning or searching another frequency band.
  - Note: Depending upon the frequency and mode stored as the priority channel, 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.
  - The priority mode is automatically suspended while entering frequencies via the numeric keypad, this prevents changing frequency while programming the AR5700D.
- **How to setup the priority channel:**

We need to select one previously registered memory channel of a given bank, and setup the interval time by which that priority channel will be automatically checked.

1. Press [FUNC] + [PRIO]
2. Select the bank number with the sub-dial.
3. Select the channel number with the main dial.
4. Press the [DOWN] key to highlight P-INTER.
5. Use the sub-dial to select an interval time between 1 and 99 seconds.
6. Press [ENT] to validate.

Example:

- **How to enable the priority channel:**

- Press the [PRIO] key. The icon PRIO will be displayed on top of the screen.
- Press [PRIO] again to disable the function.



Note: Don't forget to set the squelch level correctly otherwise the receiver will stay on the priority channel even if no signal is present.

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## 7. SIMULTANEOUS RECEPTION (ANALOG MODES ONLY)

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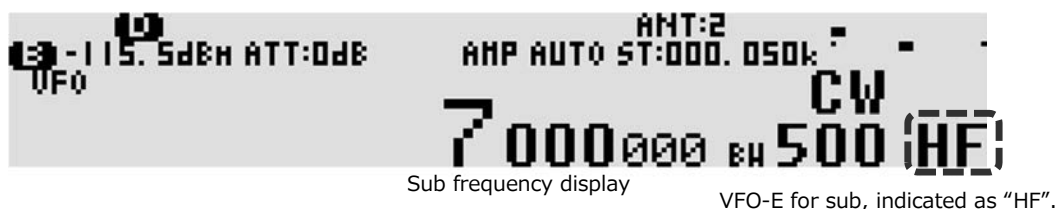
### Dual band reception:

Simultaneously receive one frequency below and one frequency above 25MHz.

- The main frequency will be above 25MHz, either VFO-A, VFO-B, VFO-C or VFO-D. Its antenna socket is ANT.1.
  - The sub-frequency will be below 25MHz, VFO-E. Its antenna socket is ANT.2.
1. To enable dual band reception, press [FUNC] followed by a long press on [VFO].  
A “D” icon will be displayed at the top left of the screen.
    - To toggle between the main and sub frequencies while the function is activated, use the [UP] and [DOWN] keys.
    - To change the audio balance between the two signals, press [FUNC] and adjust the balance with the AF GAIN knob.
  2. To disable dual band reception, press [FUNC] followed by a long press on [VFO].  
The “D” icon will then be off.

Note: Via PHONES and LINE OUT sockets, MAIN are audible on the left side and SUB on the right side, except for FM modes with IF bandwidth 100kHz and 200kHz where they are audible as a “mono” source.

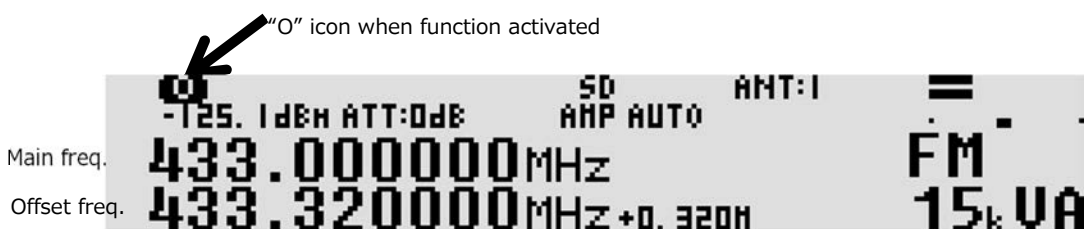
“D” icon when function activated



## Offset reception

Simultaneously receive one main frequency and one sub-frequency within +/-5MHz from the main frequency.  
(Above 25MHz only.)

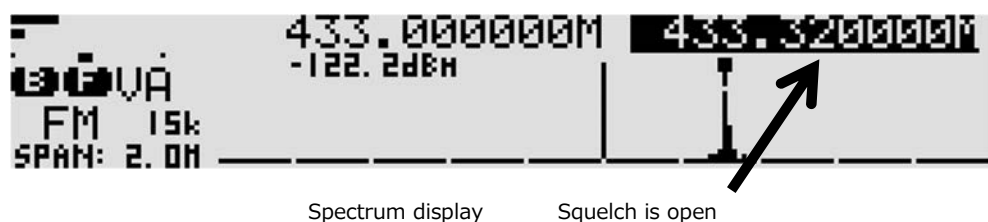
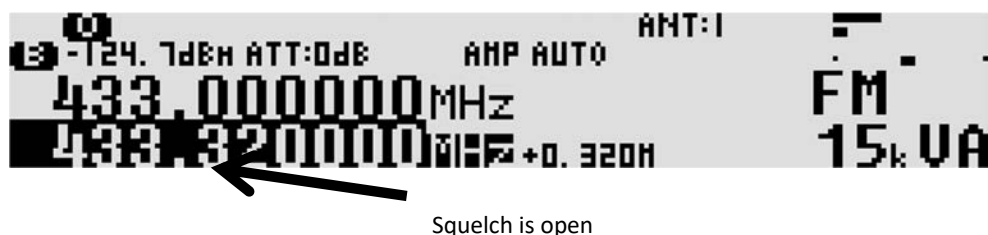
- Possible above 25MHz only.
  - Both the main and offset frequency must have the same receive mode.
  - IF bandwidth must be less than 100kHz.
1. To enable offset reception, press [FUNC] + [5].  
An "O" icon will be displayed at the top left of the screen.  
The upper frequency is your main frequency, the lower frequency your offset frequency.
  2. Tune the offset frequency by rotating the sub-dial. For each click the frequency will be incremented by the step you have set for the current VFO.  
The frequency for which the squelch is currently open, will be highlighted.
  - To switch to spectrum display mode and visually monitor both signals, long press the [FUNC] key.
    - To change the audio balance between the two signals, press [FUNC] and adjust the balance with the AF GAIN knob.
  3. To disable offset reception, press [FUNC] + [5].  
The "O" icon will then be off.



Display for main frequency and offset frequency



Spectrum display while in offset reception



## **Triple reception**

It's a combination of dual band reception, and offset reception, as described above. In other words, it allows to simultaneously receive one HF frequency and two VHF or UHF frequencies in offset mode.

1. Set up the two VHF or UHF frequencies, as described in OFFSET RECEPTION, and activate the function.
  2. Set up the HF frequency as described in DUAL RECEPTION, and activate the function.
- With all three frequencies properly setup, both the “D” and the “O” icons will appear at the top left of the screen.

To deactivate the triple reception function:

1. Press [FUNC] + [5]
2. Press [FUNC] followed by a long press of [VFO].

Both icons will be off.

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## 8. VFO SEARCH

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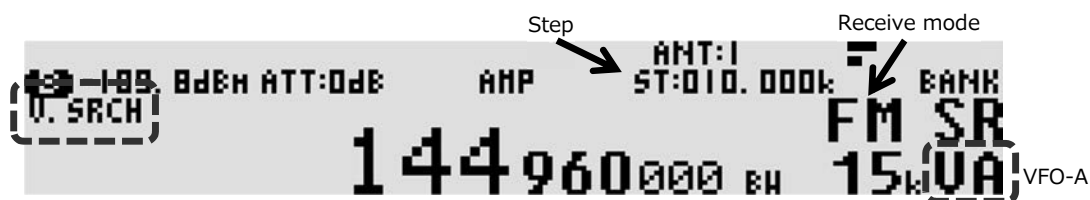
This function is a quick and convenient way to search frequencies between two VFOs. There are 2 methods available:

- Search between VFO-A and VFO-B.
- For VFO-C, VFO-D and VFO-E, the search is done between that VFO and either the lowest (9kHz) or highest (3700MHz) frequency the receiver is able to receive.

The receive mode and frequency step used for search are those you select for the first VFO. (Auto-store cannot be activated in VFO search.)

- **Search between VFO-A and VFO-B**

1. Input a frequency for VFO-A by using the numerical keypad and validate with [MHz].  
(If needed change receive MODE by pressing [MODE], select the mode by using the sub-dial and press [ENT].)  
(If needed change frequency STEP by pressing [STEP], select the step by using the sub-dial and press [ENT].)
2. Press [VFO] to change to VFO-B.
3. Input a frequency for VFO-B by using the numerical keypad and validate with [MHz].
4. Press [VFO] four times to select VFO-A again.
5. Long-press [VFO] to start the VFO search (V.SRCH will be displayed at the left of the screen)  
(If needed adjust the squelch level by rotating the SQUELCH dial, otherwise the search might not start.)
6. Once search has stopped on an active frequency, you can resume the search by slightly rotating the main dial.  
The search direction can be changed by slightly rotating the main dial clock-wise or counter-clock wise.
7. To leave VFO search, press the [VFO] key.



- **Ex.: Search between VFO-C and 3700MHz or 9kHz**

1. Select VFO-C by pressing VFO a number of times until VC is displayed at the bottom right corner of the screen.
2. Input a frequency for VFO-C by using the numerical keypad and validate with [MHz].  
(If needed change receive MODE by pressing [MODE], select the mode by using the sub-dial and press [ENT].)  
(If needed change frequency STEP by pressing [STEP], select the step by using the sub-dial and press [ENT].)
3. Long-press [VFO] to start the VFO search (V.SRCH will be displayed at the left of the screen)  
(If needed adjust the squelch level by rotating the SQUELCH dial, otherwise the search might not start.)
4. Once search has stopped on an active frequency, you can resume the search by slightly rotating the main dial.  
The search direction can be changed by slightly rotating the main dial clock-wise or counter-clock wise.
5. To leave VFO search, press the [VFO] key.

- **Adjusting the squelch behavior for VFO SEARCH:**

- DELAY:** Pause length after the signal drops until the squelch closes and scan resumes. Possible values are OFF or from 0.1 to 9.9 seconds.
- VOICE:** Scan will stop on an active signal only if "voice" sound is detected. Possible values are OFF or from

detection level 1 to 7.

1. Press [FUNC] + [VFO]
2. Highlight the desired parameter using the [DOWN] key.
3. Change the value for that parameter by rotating the sub-dial.
4. Press [ENT] to validate.



UFO MODE  
DEHYB0.2  
VOICE:OFF



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## 9. PROGRAM SEARCH

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- This function tunes the receiver through all frequencies between two specified frequency limits in the predetermined step size, looking for active frequencies.
- The search instructions may be programmed into “search banks”.
- There are 40 search banks, numbered from 00 to 39.
- Search banks can be searched either individually or in a group of linked search banks.
- There are 20 search groups, numbered from 00 to 19.
- It is crucial to correctly set the squelch level for the search function to operate. To set the squelch, tune the receiver to an inactive frequency, then increase the squelch level just up to the point where noise is muted. The squelch should open only when a signal is active on the frequency.
- Note: Search mode is very effective for AM & NFM use in the VHF and UHF bands. However, searching the shortwave bands is usually ineffective due to the relatively high noise floor.

### 9.1 Create or edit a search bank

The band frequency limits, receive mode, IF bandwidth, search bank title, etc... have to be registered first.

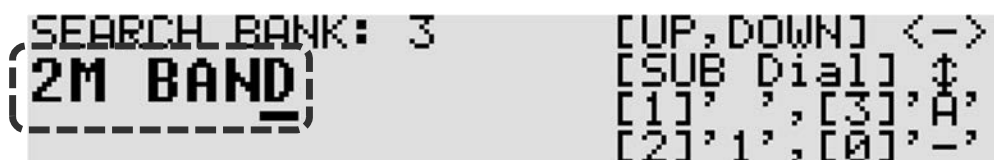
- **To create a search bank:**

1. Press [FUNC] + [1] to access the search bank registration page.



BANK: 3  
LO: 0145.120000  
HI: 0145.820000  
MODE: AUTO  
IFB: 15k  
STEP: 020.000k  
TEXT: 2M BAND

2. **BANK:** Assign a bank number (between 00 and 39) by rotating the sub-dial.
3. Press [DOWN] to go to the next line.
4. **LO:** Input the LOWEST frequency with the numerical keys.
5. Press [DOWN] to go to the next line.
6. **HI:** Input the HIGHEST frequency with the numerical keys.
7. Press [DOWN] to go to the next line.
8. **MODE:** Select the receive mode by rotating the sub-dial.
  - In case of AUTO, the IF bandwidth and step being automatically assigned, the lines IFB and STEP will be bypassed.
9. Press [DOWN] to go to the next line.
10. **IFBW:** Select the IF bandwidth by rotating the sub-dial.
11. Press [DOWN] to go to the next line.
12. **STEP:** Select the frequency step by rotating the sub-dial.
13. Press [DOWN] to go to the next line. This will display the **TEXT** input page.



SEARCH BANK: 3  
( 2M BAND )  
[UP, DOWN] <->  
[SUB Dial] ↑  
[1] ' ' , [3] ' A '  
[2] ' 1 ' , [0] ' - '

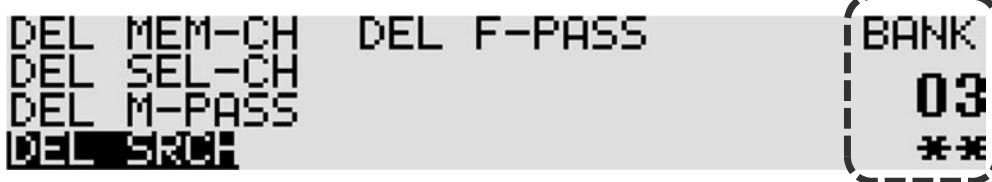
14. Select the first letter by rotating the sub-dial.
  - Go to the next digit by pressing the [UP] key.
  - To go to the previous digit, press the [DOWN] key.
  - To erase a selected digit, press [PASS].
  - To insert a blank space, press the [.] key.
15. To save the search bank name tag entry and leave this page, press [ENT].

- **To edit search bank content:**

To change the content of a search bank already created, proceed the same way as described above in “To create a search bank” and simply input new values.

- **To erase a search bank:**

1. Press [FUNC] + long press on [.]
2. Use the [DOWN] key to select DEL SRCH.



3. Select the search bank number by rotating the sub-dial. (Search banks with content are marked \*\*. Banks without content are marked -.)
4. Press [PASS].
5. Press [ENT].

## 9.2 Run a search

The receiver search function scans the step frequencies between the two frequency limits that have been set previously, looking for active frequencies. It is crucial to correctly set the squelch level for the search function to operate. To set the squelch, tune the receiver to an inactive frequency, then increase the squelch level just up to the point where noise is muted. The squelch should open only when a signal is active on the frequency.

- **To scan a search bank (common linear method):**

1. Open the squelch fully.
2. Press [SRCH] to enter the search mode. (SRCH will be displayed at the left of the screen)
3. Select the bank number to search with the sub-dial. Check the far right of the screen for the currently selected search bank number BANK XX SR. If you created only one search bank, then one will be automatically selected.
4. Slowly turn the SQUELCH knob clockwise until search starts,
  - If search stops on an inactive frequency (white noise), it means the squelch level needs to be increased.
  - Search direction can be changed with the [UP] and [DOWN] keys.
  - To force search to resume (even though it stopped on an active frequency) turn the main dial slightly.
  - Pressing [ENT] while searching stopped on an active frequency will copy that frequency to VFO-D and switch to that VFO.
  - You can switch to another search bank (providing you have created more than one) on the fly, by rotating the sub-dial.
5. To quit the search mode, press [SRCH].



- **To scan a search bank (CYBER SEARCH method):**

- The cyber search function uses FFT technology to achieve faster search speeds by looking simultaneously at all frequencies between LOW and HIGH, with a signal level above the set squelch level.
- Search results are not in frequency order, but signal level order. The strongest signals are detected

- first.
- Search results are registered in memory bank 38.
- Only one search bank can be cyber searched at a time.

1. Long press on [SRCH] to enter the cyber search mode. (CYBER will be displayed at the left of the screen.)



2. Select the bank number to cyber search with the sub-dial. Check the far right of the screen for the currently selected search bank number BANK XX. If you created only one search bank, then one will be automatically selected.
3. Rotate the SQUELCH knob until desired level is set. Only signals above this level will be detected.
  - A rotating “/” sign indicates that a cyber search is ongoing.
  - If search stops on an inactive frequency (white noise), it means the squelch level needs to be increased.
  - To force search to resume (even though it stopped on an active frequency) turn the main dial slightly.
  - Pressing [ENT] while cyber searching stopped on an active frequency will copy that frequency to VFO-C and switch to that VFO.
  - You can switch to another search bank (providing you have created more than one) on the fly, by rotating the sub-dial.
4. To quit the cyber search mode, press [SRCH].

- **Display search bank names:**

During the search or cyber search function is active, you can choose whether or not to display the name tags you assigned to the search bank(s).

- Press [FUNC] + [MHz]. Only the name tag will be displayed.
- Press [FUNC] + [MHz] again. Both the name tag and the frequency will be displayed.
- Press [FUNC] + [MHz] again to return to default: Only the frequency is displayed.

## 9.3 Search pass

This function allows individual frequencies to be skipped during search. This can be useful to remove blank carriers or unwanted signals from continuously stopping the search process.  
1230 (30 per search bank + 30 for VFO search)

- **How to register a pass frequency during search:**

While search has stopped on an unwanted frequency, proceed as follows:  
Press [PASS]. Search will then resume.

- **How to manually add a pass frequency or a range of frequencies:**

1. Long press [PASS] to access the search pass registration screen.
2. Select the target search bank (00 to 39, or VFO) by rotating the sub-dial.
3. Press [DOWN] to select the CH: line and chose a channel number between 00 and 29 for the pass frequency you will input.



4. Press [DOWN] to select the LOWER: line and enter the lowest frequency of the range you would like to bypass.
5. Press [DOWN] to select the UPPER: line and enter the highest frequency of the range you would like to

bypass.

6. If you just wish to enter one pass frequency, LOWER and UPPER will be the same.
7. Press [CLR] once finished to leave this screen.

● **How to erase a single pass frequency or range of frequencies:**

1. Long press the [PASS] key.
2. Select the target search bank (00 to 39, or VFO) by rotating the sub-dial.
3. Press [DOWN] to select the CH: line and chose the channel number you would like to erase.
4. Press [PASS] to erase.
5. Press [CLR] to leave this screen.

● **How to erase all pass frequencies of a search bank:**

1. Press [FUNC] + long press on [.]
2. Use the [DOWN] key to select DEL F-PASS.



3. Select the search bank number (00 to 39, or V for VFO) by rotating the sub-dial. (Search banks with content are marked \*\*. Banks without content are marked —.)
4. Press [PASS].
5. Press [ENT] to validate.

## **9.4 Create a group of linked search banks**

There are 20 search groups (numbered from 00 to 19) that may be set up individually to search a group of linked search banks. Each search group can be setup with its own squelch parameters as follows:

- **PAUSE** which is the time after which search will resume, whether or not the signal is interrupted.
- **DELAY** which is the pause length after the signal drops until the squelch closes and search resumes.
- **VOICE** which has search only stop on voice type audio.
- **AUTO-STORE** which saves the first 50 active frequencies found during search, into bank 39, for later browsing.

● **How to create a search group:**

1. Press [FUNC] + [SRCH].
2. Assign a search group number between 0 and 19 by rotating the sub-dial.
3. Press [PASS] to enable this scan group. LINK:OFF will change to LINK:ON.
4. Using the numerical keys enter the search bank number to be linked. Caution is needed here as you need first to move the cursor to the correct line. For example, to link banks 11, 12 and 13:
5. Press [.] to move the cursor to the second line.
6. Enter only the second digit of the desired bank, that is 1 for bank 11.
7. Press [.] to move the cursor to the second line.
8. Enter only the second digit of the desired bank, that is 2 for bank 12.
9. Press [.] to move the cursor to the second line.
10. Enter only the second digit of the desired bank, that is 3 for bank 13.
11. Press [ENT] to validate.

Line 0 to 9	-- -- -- -- -- -- -- -- --	SRCH GRP: 1
Line 10 to 19	Cursor → -- 11 12 13 -- -- -- -- --	
Line 20 to 29	-- -- -- -- -- -- -- -- --	LINK: ON
Line 30 to 39	-- -- -- -- -- -- -- -- --	

● **Setting up squelch behavior for each search group:**

1. From the previous screen, press the [DOWN] key to access the squelch behavior screen as below:

```

SRCH GRP: 1
PAUSE: 6      VOICE: OFF
DELAY: 2.0    AUTO STORE: OFF

```

2. Toggle through each parameter via the [DOWN] key.
3. Change values by rotating the sub-dial.
4. Press [ENT] when you are done with all parameters.

● **Squelch behavior parameters description:**

- **PAUSE:** Time after which search will resume, whether or not the signal is interrupted. Possible values are OFF or from 1 to 60 seconds.
- **DELAY:** Pause length after the signal drops until the squelch closes and search resumes. Possible values are OFF or from 0.1 to 9.9 seconds.
- **VOICE:** Search will stop on an active signal only if “voice” sound is detected. Possible values are OFF or from detection level 1 to 7.
- **AUTO-STORE:** The first 50 busy frequencies found during search are automatically saved in bank 39, for later browsing.

## **9.5 Search a group of linked search banks**

● **Select the search group of previously linked search banks:**

1. Press [FUNC] + [SRCH].
2. Select the SEARCH GROUP number by rotating the sub-dial.
3. If LINK is not set to ON for this search group, press the [PASS] key to do so.
4. Validate with [ENT].

● **Start searching this group:**

- Press [SRCH] to start the search. L-BANK will be displayed at the far right of the screen indicating that this function is activated.
- Don't forget to set the squelch level correctly, otherwise search will not start.

## 10. ADVANCED FUNCTIONS

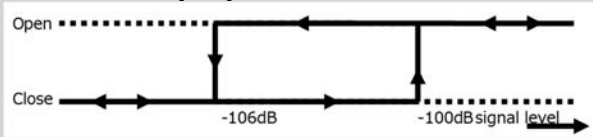
### DIGITAL MODES

<b>P25 NAC CODE</b>	[FUNC] + [0]. Go to P25 NAC with [DOWN] key.	When enabled, the receiver will only decode signals corresponding to the 3-digit hexadecimal NAC code. Each digit can hold the value 0 to 9 or A to F. That makes 4096 possible NAC codes. <ul style="list-style-type: none"> <li>• Use the sub-dial to select values.</li> <li>• [UP] or [DOWN] key to change selection.</li> <li>• [PASS] to set the function OFF.</li> <li>• [ENT] to validate.</li> </ul>
<b>NXDN RAN NUMBER</b>	[FUNC] + [0]. Go to NXDN RAN with [DOWN] key.	When enabled, the receiver will only decode signals corresponding to the RAN code. There are 63 possible RAN codes, from 01 to 63. Use the sub-dial to select a value. <ul style="list-style-type: none"> <li>• [PASS] to set the function OFF.</li> <li>• [ENT] to validate.</li> </ul>
<b>DMR COLOR CODE</b>	[FUNC] + [0]. Go to DMR COL with [DOWN] key.	When enabled, the receiver will only decode signals corresponding to the color code. There are 16 possible color codes, from 01 to 16. <ul style="list-style-type: none"> <li>• Use the sub-dial to select a value.</li> <li>• [PASS] to set the function OFF.</li> <li>• [ENT] to validate.</li> </ul>
<b>DMR SLOT NUMBER</b>	[FUNC] + [0]. Go to DMR SLOT with [DOWN] key.	Only the selected slots will be decoded. 1+2: Slot 1 or slot 2 but priority on slot 1. 2+1: Slot 1 or slot 2 but priority on slot 2. 1: Slot 1 only. 2: Slot 2 only. <ul style="list-style-type: none"> <li>• Use the sub-dial to select a value.</li> <li>• [ENT] to validate.</li> </ul>
<b>TETRA SLOT NUMBER</b>	[FUNC] + [0]. Go to TETRA SLOT with [DOWN] key.	Only the selected slot (1 to 4) will be decoded. AUTO: Whichever slot is active first will be decoded. <ul style="list-style-type: none"> <li>• Use the sub-dial to select a value.</li> <li>• [PASS] to set to AUTO.</li> <li>• [ENT] to validate.</li> </ul>
<b>DCR USER CODE</b>	[FUNC] + [0]. Go to DCR UC with [DOWN] key.	When enabled, the receiver will only decode signals corresponding to the user code. There are 511 possible user codes, from 001 to 511. <ul style="list-style-type: none"> <li>• Use the sub-dial to select a value.</li> <li>• [UP] or [DOWN] key to change selection.</li> <li>• [PASS] to set the function to ALL.</li> <li>• [ENT] to validate.</li> </ul>
<b>DCR / NXDN 15 BIT SCRAMBLE CODE</b>	[FUNC] + [0]. Go to DCR CODE with [DOWN] key.	Set the 5-digit number to decode a scrambled signal. 32767 possible combinations from 00001 to 32767. <ul style="list-style-type: none"> <li>• Use the sub-dial to select a value.</li> <li>• [UP] or [DOWN] key to change selection.</li> <li>• [PASS] to set to 00000 for no scramble code used.</li> <li>• [ENT] to validate.</li> </ul> For scramble code auto detection, long press on [1] key. Auto detection function is not remembered after reboot.

### ANALOG MODES

<b>ANALOG VOICE DESCRAMBLER</b>	[FUNC] + [0]. Go to SCR with [DOWN] key.	Limited to FM mode with IF bandwidth 6kHz and 15kHz. <ul style="list-style-type: none"> <li>• Use the sub-dial to select a value between 2000 and 7000Hz.</li> <li>• [PASS] to set the function to OFF.</li> <li>• [ENT] to validate.</li> </ul>
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## ADVANCED SQUELCH

<b>CTCSS</b>	[FUNC] + [0]. Go to CTCSS with [DOWN] key.	<p>Function which opens the squelch only when a preset tone frequency is detected in the signal. Limited to FM mode with IF bandwidth 6kHz and 15kHz.</p> <ul style="list-style-type: none"> <li>With the sub-dial select a value between 60.0 and 254.1, or ALL to open the squelch for all codes.</li> <li>[PASS] to set the function to OFF.</li> <li>Validate with [ENT].</li> </ul>
<b>DCS</b>	[FUNC] + [0]. Go to DCS with [DOWN] key.	<p>Function which opens the squelch only when a preset code is detected in the signal. Limited to FM mode with IF bandwidth 6kHz and 15kHz.</p> <ul style="list-style-type: none"> <li>With the sub-dial select a value between 017 and 754, or ALL to open the squelch for all codes.</li> <li>[PASS] to set the function to OFF.</li> <li>Validate with [ENT].</li> </ul>
<b>DTMF</b>	[FUNC] + [0]. Go to DTMF with [DOWN] key.	<p>Function which decodes characters from a DTMF tone, and displays those on screen.</p> <ul style="list-style-type: none"> <li>Use the sub-dial to select ON or OFF.</li> <li>Validate with [ENT].</li> </ul>
<b>VOICE SQUELCH</b>	[FUNC] + [VFO]. Go to VOICE with [DOWN] key.	<p>Function which only opens the squelch when “voice” is detected in the signal. Common to all VFOs. Limited to NFM and AM modes. When activated, a VCS icon appears at the left of the frequency.</p> <ul style="list-style-type: none"> <li>Use the sub-dial to select a level between 1 and 7 (or OFF).</li> <li>Validate with [ENT].</li> </ul>
<b>NOISE SQUELCH</b>	[FUNC] + [0]. Go to NOISE SQL with [DOWN] key.	<p>Function which only opens the squelch for signals above a set “noise” level. Limited to AM, all the FM modes and the digital auto mode (DALL).</p> <ul style="list-style-type: none"> <li>Use the sub-dial to set the level between 1 and 255, or OFF by pressing [PASS].</li> <li>Validate with [ENT].</li> </ul> <p>When activated, a NSQ icon is visible at the top right of the screen.</p>
<b>LEVEL SQUELCH HYSTERESIS</b>	[FUNC] + [0]. Go to LSQ L HYS with [DOWN] key.	<p>Sets the squelch hysteresis depth. For ex.: When squelch is -100dB and hysteresis is 6dB, the squelch opens when the reception level exceeds -100dB. The squelch does not close until the reception level is -106 dB or less.</p> <ul style="list-style-type: none"> <li>Use the sub-dial to set the value between 0dB and 9dB.</li> <li>Validate with [ENT].</li> </ul> 

## ANTENNA

### ANTENNA SIGNAL ATTENUATOR

[ATT]	<p>This function is used to lower the receiver sensitivity in case the signal is too strong (audio is distorted), thus overloading the receiver RF stage.</p> <ul style="list-style-type: none"> <li>Use the sub-dial to select 20dB, 10dB, 0dB, 0dB AMP or AUTO.</li> <li>Validate with [ENT].</li> </ul> <p>When AMP is activated, an AMP icon appears on top of the screen.</p> <p><b>Note:</b> In normal operation conditions, when an antenna is connected, the displayed signal level does not change even when the attenuator is used. That is because the signal level is measured at antenna input, before attenuation is applied. However, when no antenna is connected, the displayed signal level might vary for the following reasons: -When you switch the receive mode, the S-meter value changes because the IF band varies depending on the</p>
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<b>ANTENNA PROGRAMMING</b>		mode and the amount of internal noise distributed to the IF bandwidth varies accordingly. The higher the bandwidth demodulation mode, the larger the noise floor. The S-meter value is changed by the attenuator amount to add the adjusted value of the attenuator to the noise floor. The noise floor is internal noise that does not decay in the attenuator.
	[FUNC] + [kHz]. Go to ANT PROGRAM with [DOWN] key, then [ENT].	<p>Allows to program automatic antenna switching depending on the receive frequency. Each antenna input can have 10 different patterns, labeled No.0 to No.9.</p> <ul style="list-style-type: none"> <li>• Input HI and LO frequencies with the numerical keys, followed by [ENT] after each.</li> <li>• Press [CLR] once finished.</li> <li>• Toggle the pattern numbers with the sub-dial.</li> <li>• Toggle the antenna input numbers with the main dial.</li> <li>• Erase the last entered digit with the [UP] key.</li> <li>• Erase both HI and LOW entries with the [PASS] key.</li> </ul> <p>To use ANT: 3 and ANT:4, the optional antenna selector unit is required.</p>

## RF PROCESSING

<b>PRE-SELECTION FILTER</b>	[FUNC] + [0]. Go to PRESEL with [DOWN] key.	<p>This function automatically selects a filter depending on the receive frequency, to avoid interference due to strong nearby signals. Only concerns frequencies up to 25MHz.</p> <ul style="list-style-type: none"> <li>• Use the sub-dial to toggle between ON and OFF.</li> <li>• Validate with [ENT].</li> </ul>
<b>AGC</b>	[FUNC] + [STEP]	<p>AGC (automatic gain control) balances the average volume despite amplitude variations in the input signal. The recovery time of AGC can be adjusted to fit particular receive modes. Typically, FAST for CW, SLOW for USB and LSB, and MIDDLE for AM. Does not work for FM.</p> <ul style="list-style-type: none"> <li>• Use the sub-dial to select between OFF (MANUAL), FAST, MIDDLE, SLOW.</li> <li>• Validate with [ENT].</li> </ul> <p>When set to OFF, a horizontal double line icon appears on top of the 3 last digits of the frequency.</p>
<b>RF GAIN</b>	[FUNC] + [6]	<p>You can manually adjust the RF gain to decrease noise or interference from a nearby strong signal. Especially useful for SSB and CW modes. (AGC must first be set to MANUAL for RF GAIN to work.)</p> <ul style="list-style-type: none"> <li>• Use the squelch knob to increase or decrease the gain level.</li> </ul> <p>Refer to the S-METER while adjusting the level. When RF GAIN is activated, an RFG icon will appear on the top right of the screen.</p>
<b>AFC</b>	[FUNC] + [0]. Go to AFC with [DOWN] key.	<p>AFC (Automatic Frequency Control) follows the receiving frequency in case it is drifting. Only valid for FM mode with IF filters bandwidths up to 30kHz.</p> <ul style="list-style-type: none"> <li>• Use the sub-dial to toggle between ON and OFF.</li> <li>• Validate with [ENT].</li> </ul>

## ANTI-NOISE

<b>AUTO NOTCH</b>	[FUNC] + [0]. Go to NOTCH with [DOWN] key.	<p>Automatically attenuates beat tones and tuning signals.</p> <ul style="list-style-type: none"> <li>• Use the sub-dial to toggle between OFF, LOW, MID and HIGH.</li> <li>• Validate with [ENT].</li> </ul>
<b>NOISE REDUCTION</b>	[FUNC] + [0]. Go to NR with [DOWN] key.	<p>Digitally reduces random noise components and enhances desired signals that are buried in noise.</p> <ul style="list-style-type: none"> <li>• Use the sub-dial to toggle between OFF, LOW, MID and HIGH.</li> <li>• Validate with [ENT].</li> </ul>



<b>NOISE BLANKER</b>	[FUNC] + [0]. Go to NB with [DOWN] key.	Eliminates pulse-type noise such as from car ignitions. <ul style="list-style-type: none"> <li>• Use the sub-dial to toggle between ON and OFF.</li> <li>• Validate with [ENT].</li> </ul>
<b>IF SHIFT</b>	[FUNC] + [0]. Go to IF-SFT with [DOWN] key.	This function shifts the pass band of the IF filter without changing the received frequency. Useful to escape from a strong signal in the proximity of the receive frequency. <ul style="list-style-type: none"> <li>• Select the shift level (-1200 to +1200Hz) with the sub-dial.</li> <li>• Validate with [ENT].</li> </ul> Does not work with FM modes.

## DISPLAY

### SPECTRUM DISPLAY

Long-press of [FUNC].	Displays a basic spectrum. (Over 25MHz only. Disable ANALOG VIDEO OUTPUT before use!). <ul style="list-style-type: none"> <li>• You can adjust the bandwidth from 0.4 to 10MHz with [FUNC] + main dial rotation.</li> <li>• Adjust the vertical scale with [FUNC] + sub-dial rotation.</li> <li>• To fix the spectrum and tune within it, press [CLR]. The received signal is then marked by a black square.</li> <li>• To toggle the waveform averaging function, long-press [1].</li> </ul> Spectrum display disabled during “dual-band” reception. When spectrum display is enabled, AVG appears on the right of the screen.
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## VIDEO

### ANALOG VIDEO OUTPUT

[FUNC] + [0]. Go to VIDEO OUT with [DOWN] key.	<ul style="list-style-type: none"> <li>• Use the sub-dial to toggle between ON and OFF.</li> <li>• Validate with [ENT].</li> <li>•</li> </ul> Only for frequencies over 25MHz.
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### ANALOG VIDEO IF DIRECTION

[FUNC] + [0]. Go to VIDEO IMG with [DOWN] key.	<ul style="list-style-type: none"> <li>• Use the sub-dial to toggle between +(normal) and - (reverse).</li> <li>• Validate with [ENT].</li> </ul>
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## MEMORY

### ALLOCATING MEMORY CHANNELS

[FUNC] + [0]. Go to MEMORY CHANNEL ALLOCATION with [DOWN] key + [ENT].	Although 50 channels are allocated by default for each of the 40 banks, you can decide how to allocate the available 2000 channels, from 5 to 95 channels per bank. <ul style="list-style-type: none"> <li>• Select the bank number with the sub-dial.</li> <li>• Using the main dial, chose the number of channels to allocate to this bank.</li> <li>• Once finished, validate with [ENT].</li> </ul>
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## 11. SYSTEM SETTINGS

### LOCATION

#### REGIONAL SETTINGS

[FUNC] + [kHz]. Go to LOCAL with [DOWN] key.

- Select the analog band plan region (USA, Japan or Europe) with the sub-dial.
- Validate with [ENT].

### DATE & TIME

#### DUAL CLOCK & CALENDAR SETUP

[FUNC] + long press on [7].

- Main dial and sub-dial to change values.
- [UP] or [DOWN] key to change selection.
- [PASS] to erase.
- [ENT] to validate and next page.

#### CLOCK DISPLAY SELECTION

[FUNC] + [7]

- Toggle clocks with the sub-dial.

#### SET UP ALARM & RADIO START/REC TIMER

[FUNC] + long press on [8].

Time based on CLOCK #1.

- Main dial and sub-dial to change selection.
- [UP] or [DOWN] key to change selection.
- [ENT] to validate.

Timer max. length 120 min.

#### ACTIVATE/DEACTIVATE ALARM & RADIO START/REC TIMER

[FUNC] + [8]

ALARM icon on top of screen when active.

#### SLEEP SETUP

[FUNC] + long press on [9].

- With the sub-dial select length in minutes (1-120) or OFF.
- Validate with [ENT].

#### ACTIVATE/DEACTIVATE SLEEP

[FUNC] + [9]

SLEEP icon on top of screen when active.

### OPERATION

#### KEY LOCK ACTIVATION/DEACTIVATION

[FUNC] + [2]

All front panel keys and knobs are locked, except AF GAIN and SQUELCH.  
KEY icon on top of screen when activated.

#### BACKLIGHT

[FUNC] + [kHz]

- Toggle ON/OFF with the sub-dial and validate with [ENT].

#### BEEP SOUND

[FUNC] + [kHz]. Go to BEEP with [DOWN] key.

- Select beep level between 0 and 7 with the sub-dial.
- Validate with [ENT].

#### SUB-DIAL STEP SIZE

[STEP] + [UP]

By default, step size of the sub-dial is equal of that of the main dial. However, you can set a separate step size for the sub-dial to fit your particular application.  
Rotate the sub-dial to select between: =MAIN, x10, 0.1kHz up to 1,000kHz.  
Validate with [ENT].

### READ-OUT

#### SIGNAL LEVEL UNIT

[FUNC] + [kHz]. Go to UNIT with [DOWN] key.

- Select the signal level unit on screen (dBm or dBu/dBuv) with the sub-dial.
- Validate with [ENT].

## AUDIO

### SETTING LOW/HIGH- PASS FILTERS, DE-EMPHASIS, CW PITCH

[FUNC] + [MODE]

- Sub-dial to change values.
- [UP] or [DOWN] key to change selection.
- [ENT] to validate.

Pass filters do not work in CW mode. De-emphasis only for WFM mode.

## INTERFACING

### SERIAL PORT SPEED

[FUNC] + [kHz]. Go to BPS with [DOWN] key.

- Select the desired serial port speed with the sub-dial.
- Validate with [ENT].

Possible selections: 9600, 19200, 38400, 57600, 115200 bps.

## SD

### SD CARD INFORMATION

[FUNC] + [kHz]. Go to SD INFO with [DOWN] key, then [ENT].

Shows the SD card's total size and available free space in kB, and how many hours of audio which can still be recorded on that card.

### FORMATTING THE SD CARD

[FUNC] + [kHz]. Go to SD FORMAT with [DOWN] key, then [ENT].

- Press the [MHz] key to start the formatting (FAT32), or the [CLR] key to cancel.

Formatting the SD card will destroy all its data!

## BRAINS

### DISPLAY THE RECEIVER FIRMWARE VERSION

[FUNC] + [kHz]. Go to VERSION with [DOWN] key, then [ENT].

The receiver hosts 3 different firmwares: MAIN, D for DECODER and P for PANEL. Each firmware number has 4 digits.

### FACTORY RESET (method 1)

[FUNC] + [kHz]. Go to INITIALIZE with [DOWN] key, then [ENT].

- Press the [MHz] key to start the reset, or the [CLR] key to cancel.

Note: Resetting the receiver will revert all its settings to factory default and erase ALL memory data. It is advised to do a backup to SD before applying a reset.

### FACTORY RESET (method 2)

(Switch off the back panel's main power switch)

- While pressing and holding the [5] and [7] keys, switch the back panel's main power switch to ON.
- Release the keys when the S-Meter lights up.

Note: Resetting the receiver will revert all its settings to factory default and erase ALL memory data. It is advised to do a backup to SD before applying a reset.

---

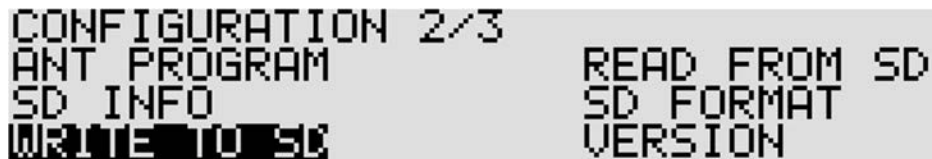
## 12. RECEIVER DATA BACKUP AND RESTORE

---

### ● Receiver data backup

Receiver settings and memory data may be saved to an SD card.

1. Insert the supplied SD card into the [SDCARD] slot located on the front panel. The receiver will read the card's file structure and then display the [SD] icon on top of the LCD screen once ready. (The larger the SD capacity, the longer it can take, so please be patient.)
2. Press [FUNC] + [kHz] to access the CONFIGURATION menu.
3. Press the UP key until WRITE TO SD is selected and validate with [ENT].



CONFIGURATION 2/3  
ANT PROGRAM  
SD INFO  
WRITE TO SD  
READ FROM SD  
SD FORMAT  
VERSION

4. Chose a file name of up to 8 ASCII characters for this backup. The selected digit is underlined.



ENTER FILE NAME  
00000000

- Use the sub-dial to toggle between numbers and letters. Spaces are invalid.
  - Go to the next digit with the [UP] key. [DOWN] key for previous digit.
  - The last digit to the right can be erased with the [PASS] key.
  - If you already have a backup file with the same name on the SD card, it will be overwritten!
5. Press [ENT] to save to SD.



MESSAGE  
NOW WRITING...

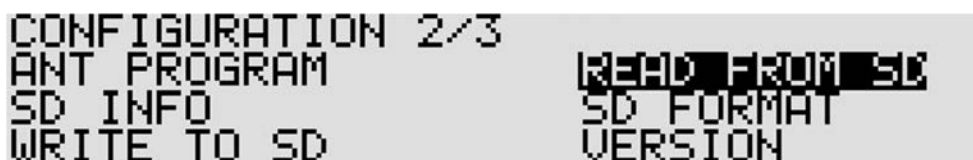


MESSAGE  
COMPLETED

## ● Receiver data restore

Receiver settings and memory data previously saved to an SD card, can be imported to the receiver.

1. Insert the SD card into the [SDCARD] slot located on the front panel. The receiver will read the card's file structure and then display the [SD] icon on top of the LCD screen once ready. (The larger the SD capacity, the longer it can take, so please be patient.)
2. Press [FUNC] + [kHz] to access the CONFIGURATION menu.
3. Press the UP key until READ FROM SD is selected and validate with [ENT].



CONFIGURATION 2/3  
ANT PROGRAM  
SD INFO  
WRITE TO SD  
READ FROM SD  
SD FORMAT  
VERSION

4. Select the desired file with the [DOWN] key and validate with [ENT].



<[SUB -]      PAGE 0      [SUB +]>  
00000000.0000      165376      2019/06/26 15:25:04

- Use the sub-dial to change pages in case there are many files.
- NOW READING is displayed during the file reading process.
- To delete selected files on SD, press [FUNC] + [.]
- To rename selected files, do a long press on [MHz].

---

## 13. CONTROL SOFTWARE AR-IQ-III

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- The AR-IQ-III software allows receiver control, I/Q recording and playback for your AR5700D receiver.
- The receiver's I/Q digital output represents the actual signal used after digital processing in the receiver.
- The digital I/Q output interface streams I/Q data to the PC through USB2.0 isochronous mode, at 72Mbit/sec with a sampling rate of 1.125Msample/sec. All commands are sent to the receiver through the receiver's remote-control USB port.
- Compared to a regular AF, which only allows recording one frequency at a time, I/Q allows you to store and playback a full 0.9MHz bandwidth with no loss of quality!
- This 0.9MHz bandwidth can be anywhere within the receiving range of the receiver.
- Off-line, you can listen and decode within the recorded 0.9MHz range, tuning any frequency as you would in real time. You can even loop a particular time frame to listen repeatedly to a signal received in difficult conditions, or search for and analyze hard to catch signals bursts.
- It is also possible to move the I/Q data to another PC and to listen/decode it off line, provided the USB license dongle is inserted into that PC.
- Please note that there is no inter-compatibility of wav files recorded with AR-IQ I, AR-IQ II and AR-IQ III, as they all use different headers.

### ● PC requirements

#### Suggested PC system:

- Supported OS: Win 7/8.1/10
- Intel I7 CPU
- 16 GHz RAM
- HDMI resolution monitor
- Large size HDD for record/playback operations
- Three available USB 2.0 ports are required (one for the I/Q stream, one for receiver control, one for the license dongle)

If you notice “audio stuttering” due to insufficient PC resources, it is possible to adjust the software's “Buffer Reads/Interval” to match your PC's specifications, as described in the “ADVANCED PARAMETERS” chapter.

### ● Connecting the receiver to the PC

Connect the two supplied USB cables as follows:

1. For receiver control: Receiver's USB socket (labelled with USB logo), to PC.
  2. For I/Q data stream: Receiver's USB socket (labelled “I/Q OUT”), to PC.
- Make sure to connect the I/Q stream USB cable to a direct USB socket connection on your PC. Avoid using a USB hub.
  - Some type of USB 3 ports can be incompatible due to the particular chipset they use. If that occurs, use a USB 2.0 port instead.

## ● License dongle

Insert the supplied USB dongle in an available USB port of your PC. Windows will automatically install a driver, recognize it as a common USB flash drive and assign a drive letter such as "D:", "E:" etc....



### **WARNING:**

- Our USB dongles are guaranteed without virus infection, nevertheless some virus detection software may incorrectly detect some of its files as a virus (or Trojan). This is called a false-positive alarm and does not mean that files are indeed infected. Whenever your virus detection software informs you about a possible threat, it usually gives you a choice of options about what to do next. Be sure to flag those files as SAFE files, otherwise the dongle's files might be rendered unusable or even deleted by the virus detection software, and the AR-IQ-III software will not run.
- It is your responsibility to make sure that your virus detection software does not accidentally render the USB license dongle and I/Q software unusable. The license information data inside the USB dongle is unique and cannot be copied or backed-up. If you damage the USB license dongle, a new one needs to be purchased.
- The license information data inside the USB dongle is unique and cannot be backed-up, copied or moved. If you lose or damage the USB dongle, a new USB dongle needs to be purchased.
- Do not record I/Q data to this dongle and do not use the dongle to store any data.
- Formatting the USB dongle, overwriting or deleting its content will destroy the licensing system, and another USB dongle would have to be purchased.

## ● Installing the drivers

There are 2 drivers to install: One for the I/Q output and one for the receiver control.

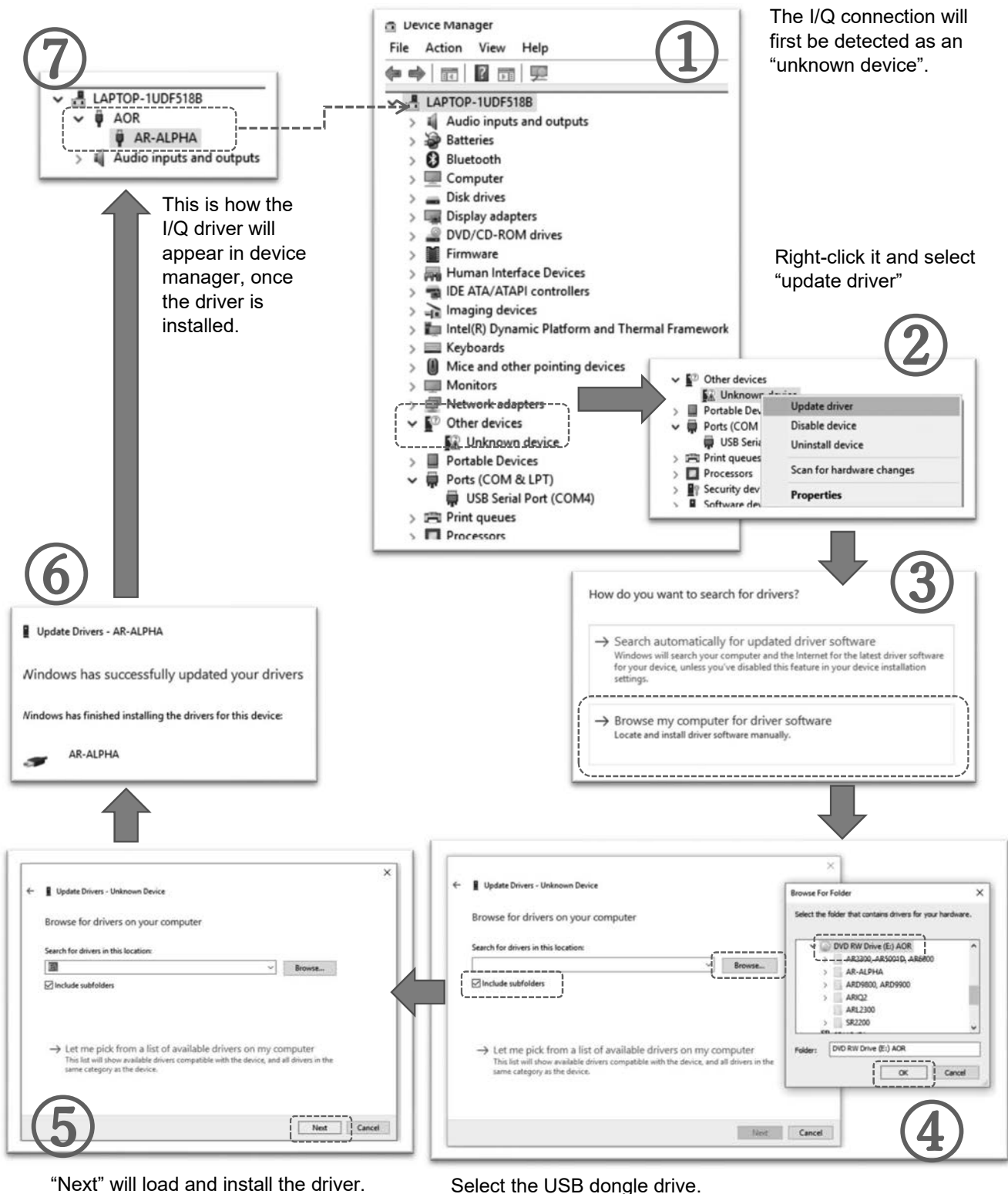
(All following instructions and screenshots are based on the Windows 10 operating system)

1. Switch the receiver ON.

Depending on your Windows version and whether or not you have already installed the drivers on your PC before, it is possible that Windows automatically installs the drivers for you.

2. To check the driver status, open WINDOWS DEVICE MANAGER (press simultaneously the Windows key and the X key, then select "Device Manager")

I/Q OUTPUT DRIVER INSTALL PROCEDURE:



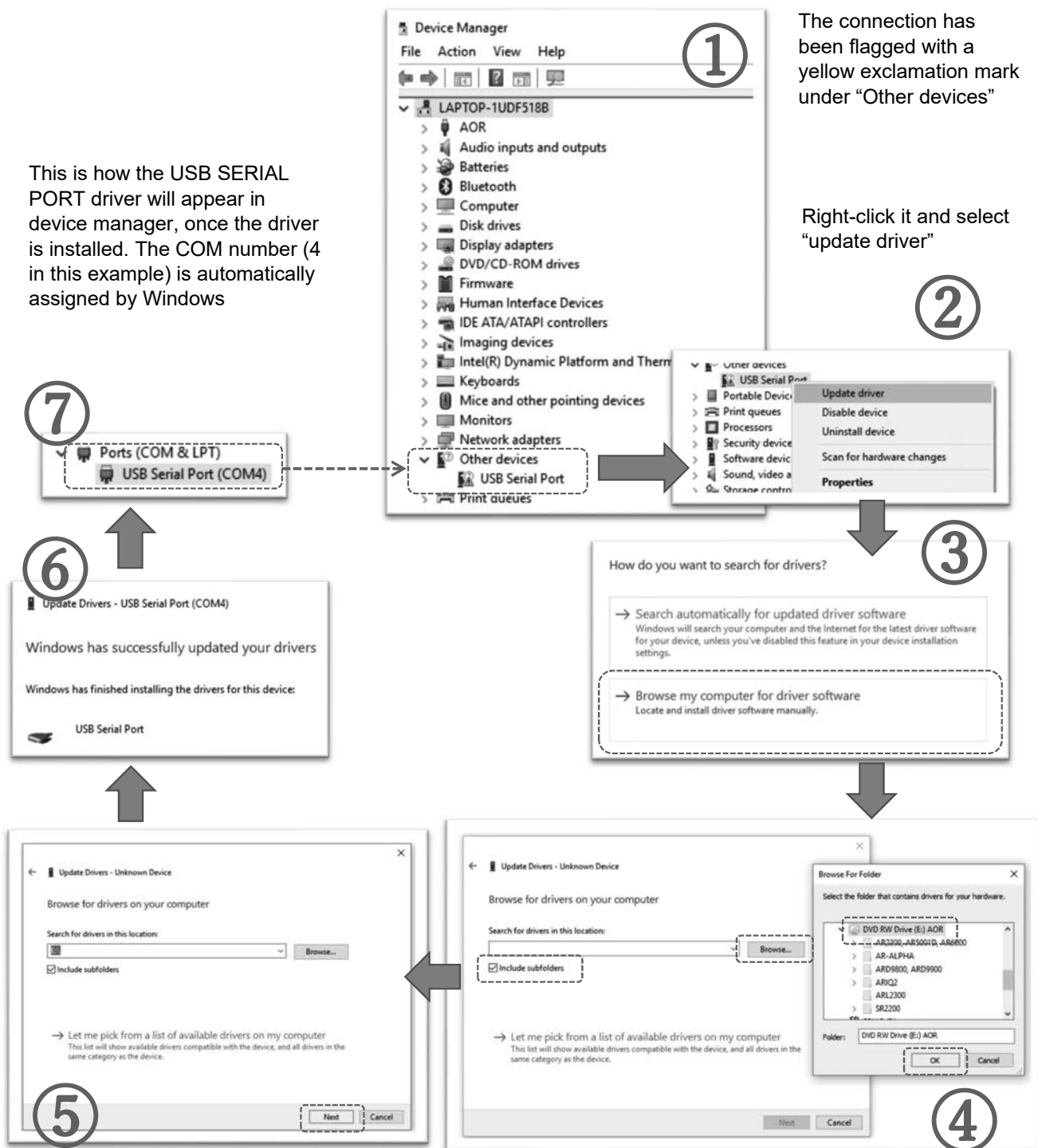
"Next" will load and install the driver.

Select the USB dongle drive.



## RECEIVER CONTROL DRIVER INSTALL PROCEDURE:

Only necessary if for some reason the USB SERIAL PORT driver has not been automatically installed by Windows or your PC is not connected to Internet and you need to manually install the driver from the supplied USB dongle.



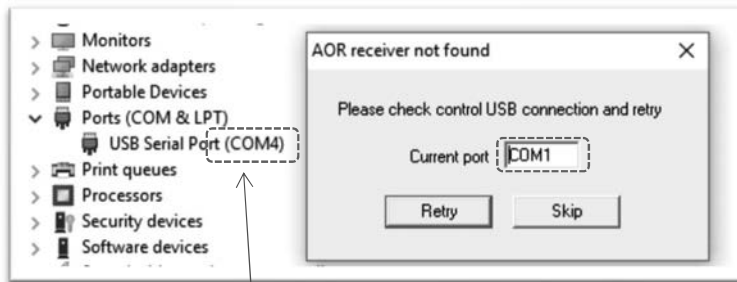
“Next” will load and install the driver.

Select the USB dongle drive.

## ● AR-IQ-III software operation

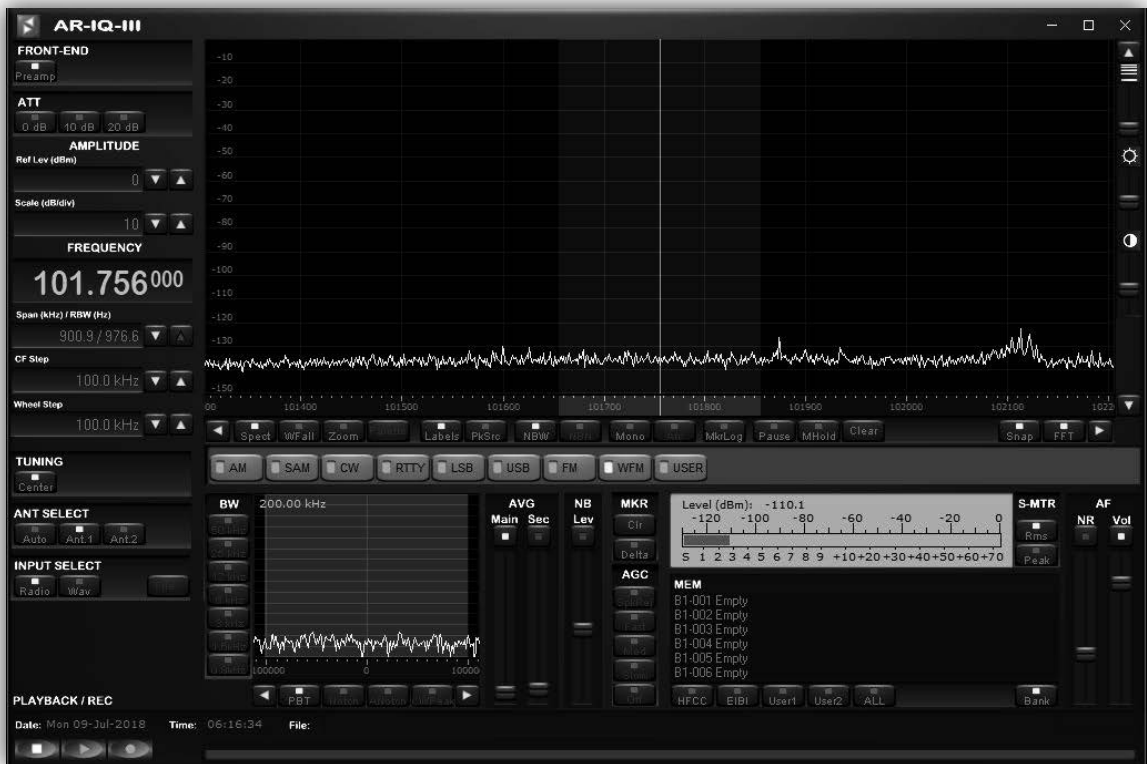
Inside the USB dongle, locate the software's executable "ariq3.exe" and double click it to start the software.  
The software runs directly from the USB dongle.

When you start the software for the first time, Windows will ask you to which COM PORT the receiver is connected. Providing the correct number is entered, it will be saved in the registry, therefore you should not need to enter it again. Nevertheless, after connecting the receiver to a different USB port on your PC, the COM port number will change. If the com port number you entered is incorrect, the following error message will appear:



The COM PORT number is the one Windows automatically assigned in DEVICE MANAGER.

### AR-IQ-III interface:



## Frequency tuning

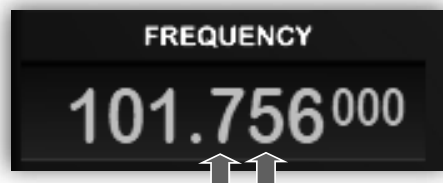
- **Frequency tuning with mouse wheel**

Tuning with mouse wheel while hovering on the digits of the frequency indicator panel. The digit of the currently tuned frequency will be shifted upwards or downwards depending on wheel rotation direction.

Example: Let's say you are tuned to 101.756 MHz and you hover the mouse over the third digit "1". Then by scrolling up or down you will change the tuned frequency of 1 MHz for each scroll increment.

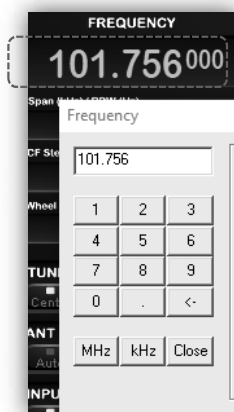
If you wish to tune by increments of 100 kHz, hover the mouse over the digit "7". Then by scrolling up or down you will change the tuned frequency of 100 kHz for each scroll increment.

To tune by increments of 10 kHz, hover the mouse over the digit "5". Then by scrolling up or down you will change the tuned frequency of 10 kHz for each scroll increment.



- **Frequency tuning by ten-key input**

1. Double click on the marked frequency indicator panel to display the ten-key window. This allows direct frequency input.
2. Enter the desired frequency by clicking on the digits of the ten-key, including the [.] if necessary.
3. Select [kHz] or [MHz]. The receiver will then be tuned to this frequency.
4. Click on "Close" when that panel is not needed anymore.



### **Frequency tuning by CF step**

Clicking on the buttons with the white triangle, on either side of the main spectrum control bar does increment or decrement the frequency by the step size set in the CF STEP indicator panel.



(Main spectrum control bar)



(Span, CF Step, Wheel Step indicator panel)

- **Frequency tuning with the frequency bar**

A) Drag the frequency bar left or right while pressing the left mouse button.



B) Hover with the mouse over the frequency bar and scroll the mouse wheel up or down, at increments as set in the WHEEL STEP indicator panel.

- **Frequency tuning with the secondary spectrum window**

Allows to fine-tune the filter passband in 3 modes: PBT, NOTCH and AMREJ.

**a) PBT mode (Passband tuning)**

Centers the carrier frequency you have double clicked on the secondary spectrum.

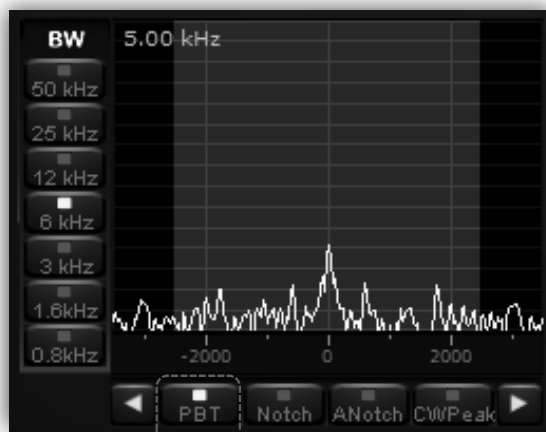
Press the left mouse button while dragging left or right does retune the center frequency.

Adjust the filter bandwidth with the mouse scroll. (30 Hz to 225 kHz, IF mode and BW dependent.)

Drag either filter edge. Hover with the mouse over the filter edge until a horizontal double arrow appears, then drag the filter edge while left-clicking.

Clicking on the white arrows does increase/decrease the frequency by the value set in WHEEL STEP.

Shift the entire filter by dragging it left or right, while pressing the right mouse button. This is an actual software emulation, therefore the received frequency and the frequency on the frequency panel do not change. Convenient for co-channel interference removal.



**b) Notch mode (not active in WFM mode)**

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

To activate it, double click the offending signal on the spectrum.

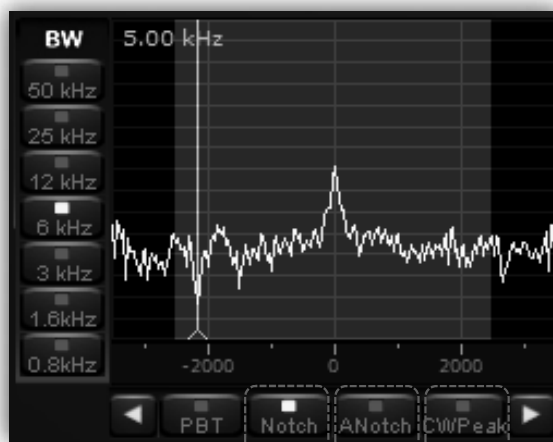
Attenuation is tunable using the mouse wheel.

Filter signal can be dragged with the left mouse button.

The notch function is also accessible in the PBT mode, by pressing the CTRL key.

Deactivate the notch by right clicking on it.

The vertical yellow bar does mark the place where the notch has been applied. The frequency is displayed at the top of the bar (5.00 kHz in this example)



**c) ANotch (auto-notch) mode (not active in WFM mode)**

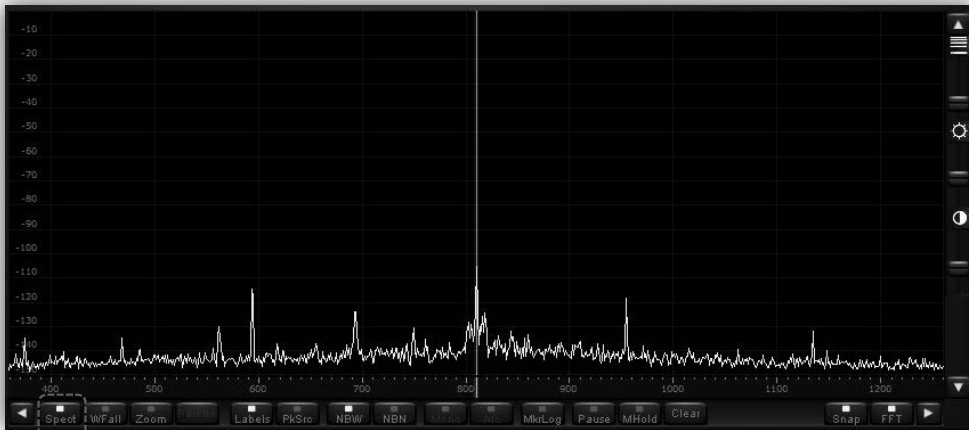
Automatically detects cycle noise and applies a notch on it. The slider with "Slow" to "Fast" markings determines the speed at which the notch is applied.

**d) CWPeak filter**

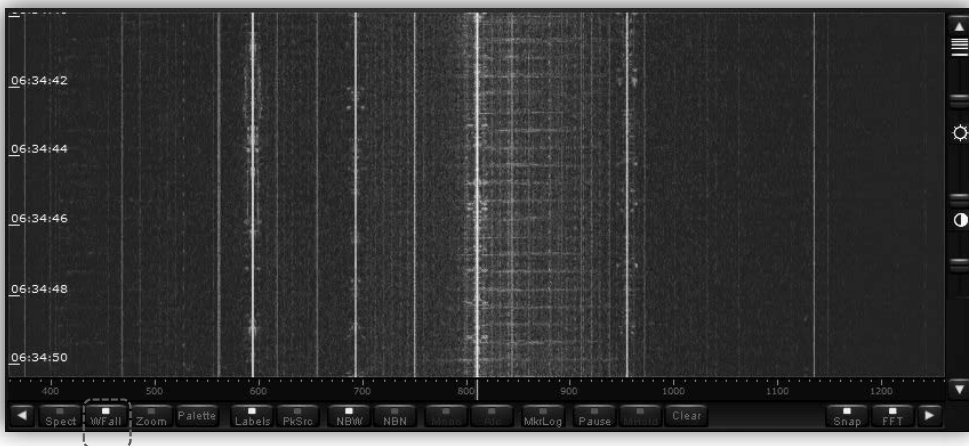
This is an adaptive filter for CW signals. It only works if there is a carrier. The slider with "Slow" to "Fast" markings determines the speed at which the filter adaptation takes place.

- **The main spectrum / waterfall window**

Displays the spectrum with a bandwidth of up to 900 kHz. (+/- 450 kHz around the center frequency). You can choose between spectrum view and waterfall view.



(Main spectrum view)



(Waterfall view)

- **Wheel step**

This is the value by which the spectrum will be shifted by scrolling the mouse wheel, when the mouse is hovered anywhere over the spectrum or waterfall.

Possible steps are:

500kHz, 100, 50, 25, 12.5, 10, 9, 5, 1kHz, 100, 10Hz, 1Hz.



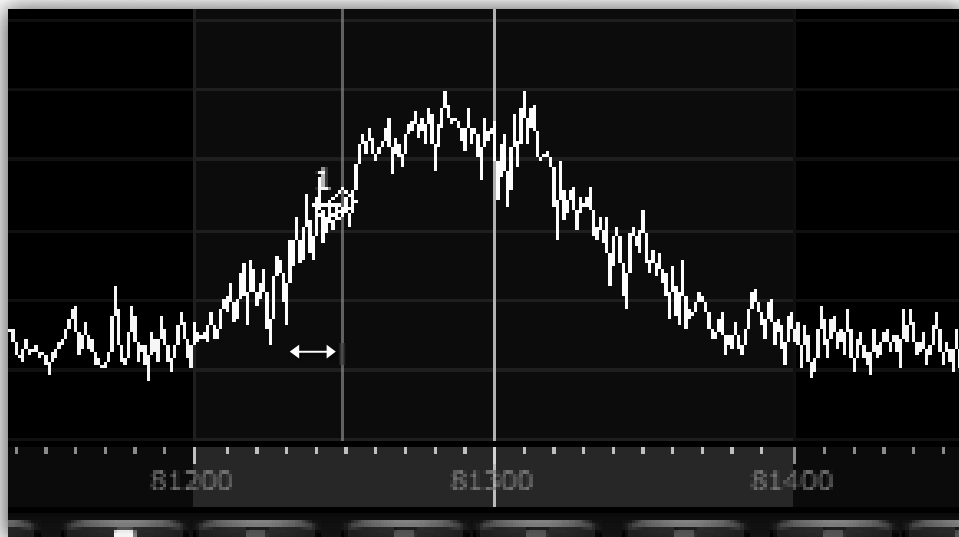
- **Frequency tuning by double click on spectrum**

It is possible to “visually” decide to which frequency you would like to tune the receiver by double-clicking directly on the spectrum or waterfall. The minimum resolution is 1 kHz.

- **Frequency tuning by mouse drag on spectrum**

Note: CENTER button in TUNING panel must be unchecked.

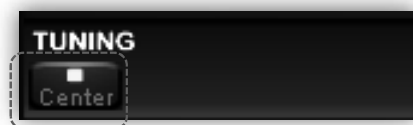
A faster way to quickly change frequencies “visually” on the spectrum is to hover your mouse inside the grayed-out range of the IF filter until the mouse pointer changes to a horizontal double arrow, then drag the mouse either left or right on to the spectrum while pressing the left mouse button.



(Tuning by mouse drag)

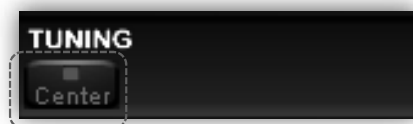
- **Frequency tuning with “center” button ON**

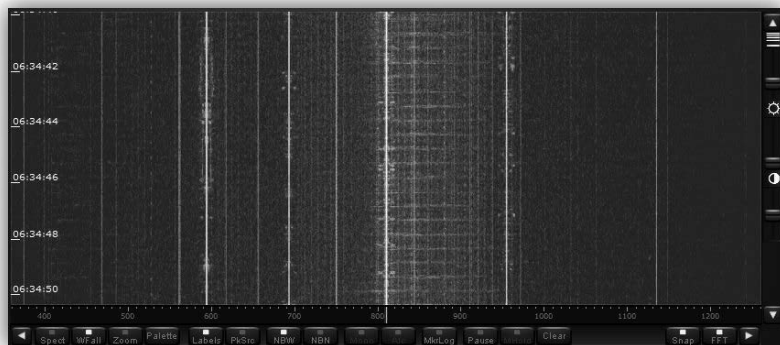
With this setting, the yellow tuning dial line will always represent the center of the frequency scale. Double clicking somewhere on the spectrum will shift the whole spectrum to the double-clicked frequency being the new center of the frequency scale. Doing so while in waterfall mode, will be the easiest way to understand the procedure.



- **Frequency tuning with “center” button OFF**

With this setting, the spectrum remains fixed, whereas the yellow tuning dial will jump to whatever frequency you double clicked on the spectrum. This mode is convenient if you want to search through frequencies between a fixed start and end frequency. Also, in the waterfall mode (see image below), you can keep track of active frequencies (vertical lines) no matter what frequency you are actually listening to.



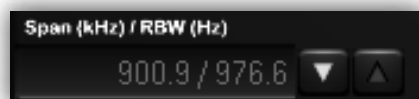


- **Span**

The span is the width of the main spectrum window. You can choose between 900.9kHz, 450.4kHz, 225.2kHz, 112.6kHz, 56.3kHz, 28.2kHz, 14.1kHz, 7.0kHz, 3.5kHz.

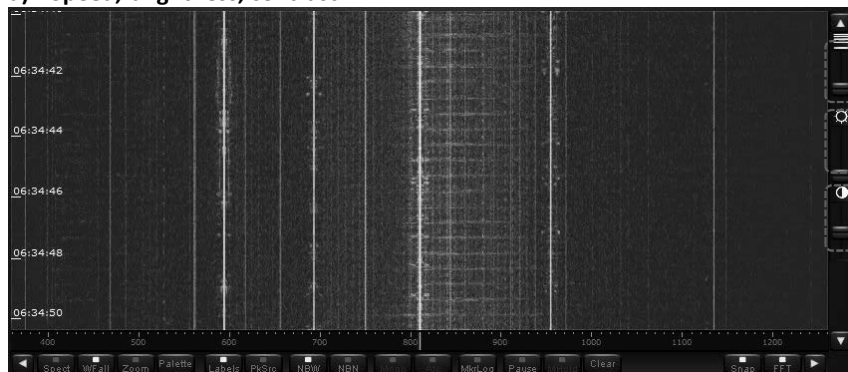
Used in both live reception and playback.

Please note that in order to provide the best possible spectrum accuracy, as per the rule  $1\text{FFT bin} = 1\text{ pixel}$ , and to avoid resampling the spectral data, the full bandwidth of 900kHz can only be displayed when the program window is shrunk to its minimum width.



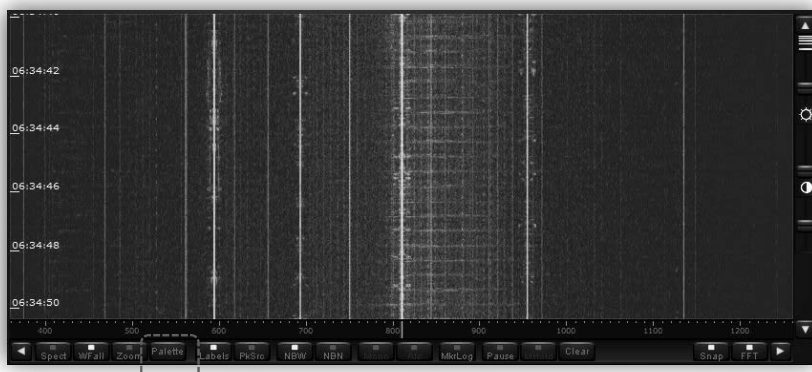
- **Waterfall control**

**a) Speed, brightness, contrast**



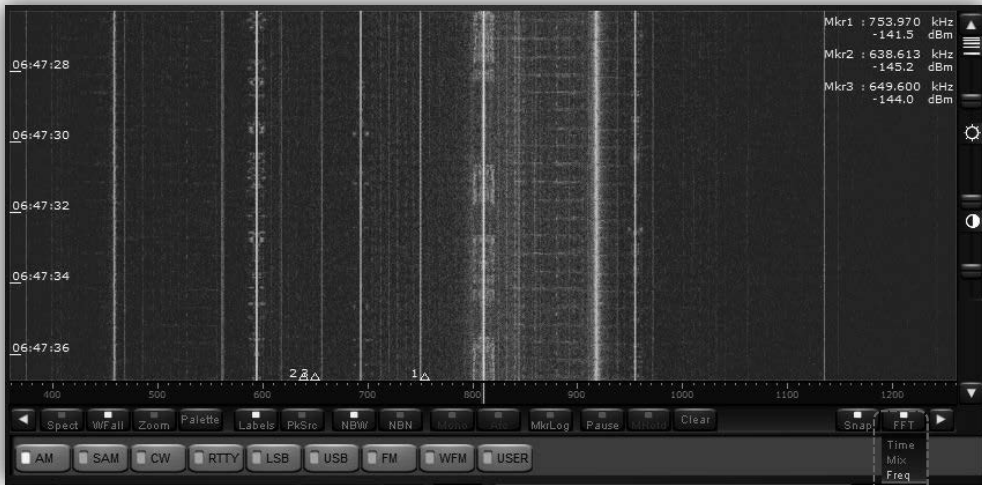
The 3 sliders on the far-right side of the spectrum window allow adjusting of the waterfall's speed, brightness and contrast for optimal viewing.

**b) Color palette**



Here you can decide which colors are displayed depending on the signal strength. Not active for regular spectrum view.

### c) FFT resolution



The FFT sharpness (spectral resolution) can be improved at the expense of refresh rate. This function is particularly useful when analyzing strong carrier signals and carrier feed-through on adjacent bins has to be reduced at minimum.

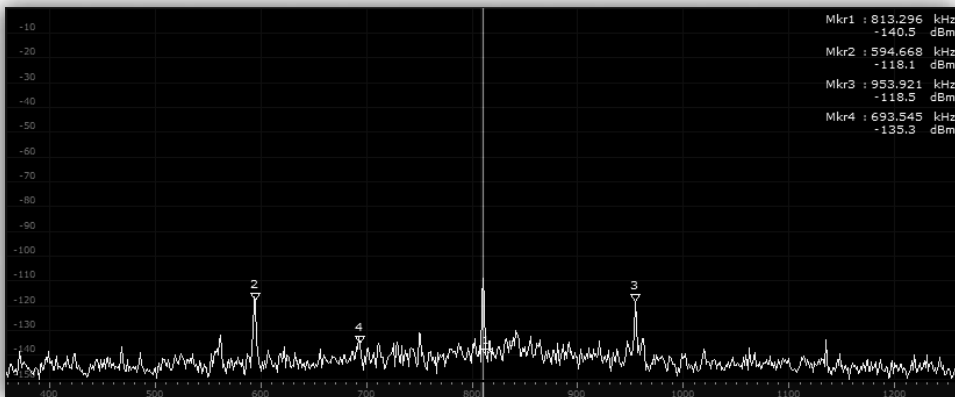
**Freq:** offers the best performance at the expense of a slight degradation of the signal amplitude accuracy and refresh rate.

**Time:** Selects the FFT algorithm of previous software versions (FFT with Hann window)

**Mix:** Selects a polyphase FFT analysis with increasing window length (Polyphase FFT with quasi-flat-top amplitude response)

- **Marker**

A right mouse click feature is available within the spectrum / waterfall panel. Right click on up to eight frequencies, and a small arrow appears. In waterfall mode, the arrow is situated where the signal waveform would be on the spectrum view. On the spectrum view, the arrows are located where the mouse was right clicked. The screenshot below shows the numbered arrows, relating to Mkr1-Mkr8 in small text on the top right. The frequency and signal intensity in dBm are also given.



(Spectrum view with MARKER function enabled)





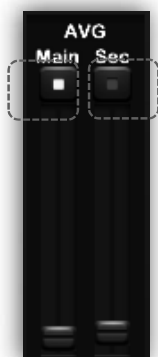
【Clr】 button: Clears the marker arrows from the spectrum / waterfall display.  
 【Delta】 button: This button changes the values from the markers 2 to 8 to delta values (different from MRK 1)

【Labels】 button: Activates a vertical scale at the left side of the spectrum window. When the scale is activated, the value of the frequency and of the amplitude of the signal at the frequency pointed by the mouse (indicated by the reference red line) will be shown.

【PeakSrc】 button: When activated, the frequency and the amplitude of the signal peak nearest to the reference line will be shown.



- **Spectrum average (AVG)**



**AVG Main:** Stabilizes the spectrum waveform in the main spectrum / waterfall display. Will also stabilize the waterfall mode. The main spectrum average function and its slider control are active only when the enable button above the slider is enabled.

**AVG Sec:** Stabilizes the spectrum waveform in the secondary “bandwidth” display/panel. The secondary spectrum average function and its slider control are active only when the enable button above the slider is enabled.

## I/Q recording & playback

AR-IQ-III allows to record 900kHz of the RF spectrum directly to the PC’s hard drive, and to play back the file at a convenient time, while having all features such as bandwidth, mode, passband tuning, etc....available as in a live reception situation.

The software will automatically divide the recording into “wav” files of approx. 2GB, which corresponds to approx. 4 minutes of recording. Although a recording is divided into multiple files, the playback will be without any interruptions.

Every 4 minutes, a new .wav file will be created of which the 3 last digits will be automatically incremented.

For example:

XXX\_000.wav

XXX is the file name you chose

After 4 minutes, the next file will be:

XXX\_001.wav

And then every 4 minutes:

XXXXXX\_002.wav

XXXXXX\_003.wav etc....

The resulting .wav file can only be played back with the AR-IQ III software! It will not work in other media player software.

- **Controls:**



The recording date is based on your PC's system date. However, the recording time is UTC.

- **Recording**

1. To record, first select the center frequency of your choice.
2. Click on the record button at the bottom left of the window.
3. A new window pops up asking for a user defined file name and folder location to store the file. For ease of use it is advised to create a file name which includes the date, such as 180622 for June 22, 2018. The software will amend this file name with \_000 to become 180622\_000.

Note: During recording and playback, the frequency range (start and end frequency) cannot be changed.

- **Playback**

1. To play back a file which has been recorded at an earlier time, click on the "Wav" button, within the "INPUT SELECT" panel.



The receiver stops receiving live signals and the "Wav" and "File" buttons are now activated.

2. Click "File" and browse on the PC to the location of the pre-recorded file(s).

If your previous recording has created numerous automatically named files, the software will playback the whole series of files if required. This playback should be continuous and flawless, even during track / file change. During playback, the software will display date and time in the same format as during recording.

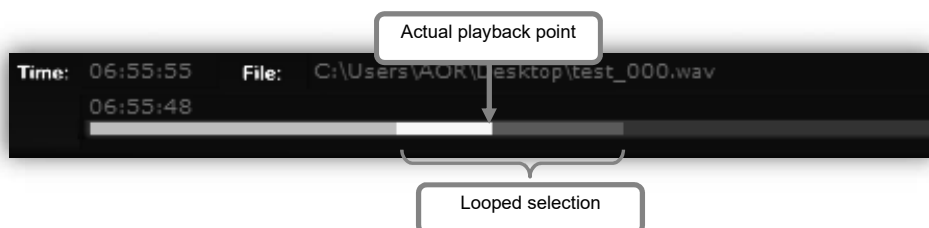
Note:

Playback of a .wav file will also work if the receiver is not connected to the PC.

Playback will only work properly if the data is read off an internal HDD, or SSD. It is unlikely to function well off a USB key, USB hard-drive, DVD disk, or any networked storage device.

- **Fast forward & rewind**

Left click anywhere on the progress bar to advance to a chosen point of the recording.



To loop the playback over a smaller selection, simply left click and hold at the desired spot on the progress bar. Drag the mouse pointer along to the right to create a new line, which will be a much paler shade of yellow. Release the mouse button to start playback immediately from the new desired spot. This should be flawless and instant. The player will repeat the new selected section only, over and over, until manually stopped. This may be useful if the user wishes to repeat a possible station ID over and over again.

A left click on the line cancels the new selection, and continues playback normally.

**Troubleshooting:** If the user fails to create a new line, but only "clicks" to attempt to advance playback by a few minutes, the software may seem to "stick". The player is probably only playing back a very small selected area over and over again, hence the impression of "stuttering and jamming".

## Other controls

- **Antenna input**



Allows manual or automatic antenna selection.

- Note regarding HF reception:

When receiving frequencies below 25MHz through the AR-IQ-III software, the HF antenna should be physically connected to the antenna socket #1, even though it's usually #2 when the receiver is used "stand-alone". This is due to the fact that the receiver's internal antenna

wiring is different when used "stand-alone" vs controlled by software.

- **Pre-amp**



Switches the receiver's front-end pre-amplification on. When in the ON position, the attenuator level is set to 0dB.

- **Attenuator**

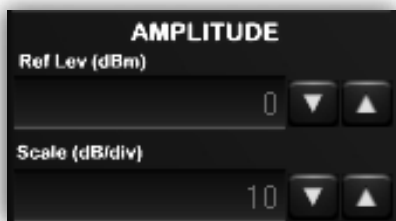


Like on a conventional receiver, the attenuator reduces signal input. This may be useful if a user has problems with strong local signals appearing on frequencies other than their own.

Possible selections: [0dB] [10dB] [20dB]

Whichever selected, the "Pre-amp" is switched off.

- **Amplitude (reference level & scale)**



Both "Ref Level" and "Scale" alter the height and position of the spectrum waveform displayed when the spectrum mode on the main panel is selected, as well as the spectrum waveform in the secondary "bandwidth" window.

- **Demodulation modes**

The following modes can be used:

AM, SAM (SYNC AM), CW, RTTY, LSB, USB, FM, WFM, USER



- **Volume & mute**

Volume control is on the bottom right of the software, though many users prefer to use the volume on their external amplifiers. The button above the volume slider enables the audio output and mutes it when disabled.

- **Noise reduction**

The NR control reduces background noise and is activated by the button above its slider control. The NR slider controls the amount of noise reduction. The noise reduction can be activated in all modes except with the USER demodulator.

- **Noise blanker (NB)**

The NB control reduces impulsive noise and is activated by the button above its slider control. The NB slider sets the threshold of the noise blanker. Care should be exercised when strong signals are present in the band where the receiver is tuned. A too low NB threshold (NB slider at or near its maximum position) may affect the quality of the tuned signal and introduce intermodulation distortions.

Two noise blankers can be selected with the two buttons "NBW" (Wide) and "NBN" (Narrow).



The Narrow NB, operates on the bandwidth selected with the BW buttons (50 kHz, 25 kHz, 12 kHz, etc.).

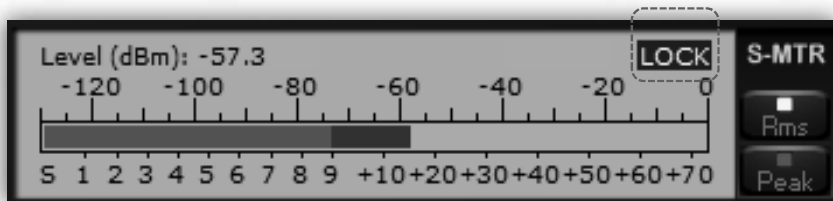
The Wide NB is more effective when there are no strong signals in the bandwidth the DDC is tuned to.

The Narrow NB is more effective in all other cases.

- **S-meter**

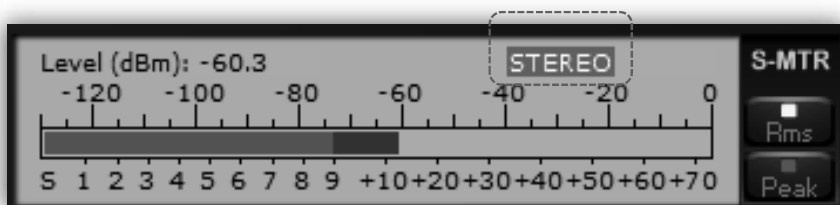
The signal strength meter (S-meter) is marked in both S points and dBm (S9=-73 dBm input). The S-meter response is very linear thorough all its scale and accurate to within less than 1 dB across the range.

**LOCK indication:** When operating in Sync AM mode (SAM), a small "LOCK" display appears at the top right of the meter, when the demodulator locks on to the AM carrier.



**STEREO indication:**

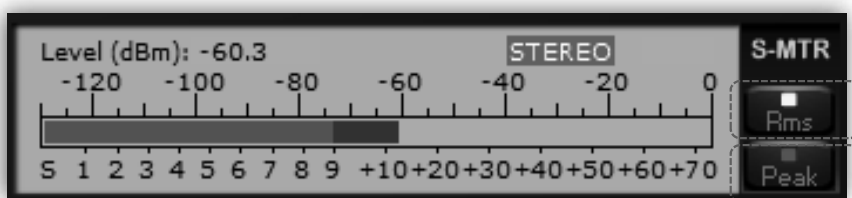
Whenever a stereo signal is decoded in WFM mode, a small "STEREO" display appears at the top right of the S-meter.



You can also force MONO reception by clicking the "Mono" button as follows:



The S-meter can be operated in RMS mode (input signal RMS power displayed) or in Peak mode (input signal peak power displayed) clicking the "RMS" or "Peak" at the right side of the S-meter.



- **Squelch & auto-mute**

Squelch and Auto-Mute threshold levels can be controlled clicking the desired value in the S-Meter bar with the left button of the mouse.

The Auto-Mute function works in the opposite way of the squelch block. It mutes the audio when the RF input level is GREATER than the desired threshold.

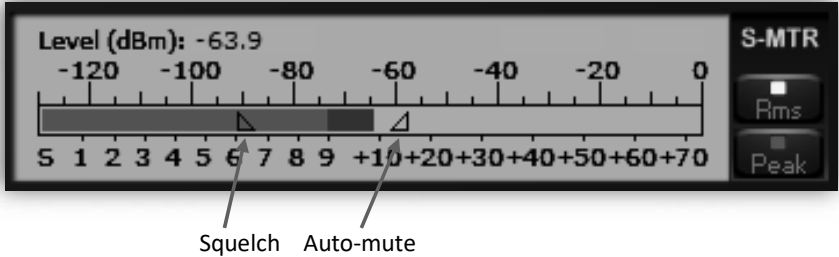
The squelch level is set clicking the S-Meter bar in the S1-S9 zone. A triangle with a left oriented vertical side in the S-Meter bar indicates the selected squelch threshold.

The Auto-Mute level is set clicking the S-Meter bar in the S9 - S9+70 zone. A triangle with a right oriented vertical side in the S-Meter bar indicates the selected Auto-Mute threshold.

To disable the squelch and/or the Auto-Mute functions, right click the appropriate S-Meter zone.

The hysteresis of the squelch and Auto-Mute functions is approximately 6 db.

The selected thresholds are peak values.



- **AGC (automatic gain control)**



The Automatic Gain Control keeps the audio output at a constant output level, disregarding the input signal power. Three-time decay constants can be selected with the buttons “Fast”, “Med”, and “Low” in the AGC control bar.

The AGC can be excluded with the “Off” button. In this case the audio output level is controlled by the VOLUME slider. When the AGC is off, large input signals can cause the saturation of the audio output.

- **AGC spike rejection**



The Spike Rejection function emulates the behavior of the AGC of old analog receivers with a relatively long attach time constant. When this function is selected the AGC circuit is much less sensitive to impulse noise which can completely close the receiver gain and affect negatively the receiver performance.

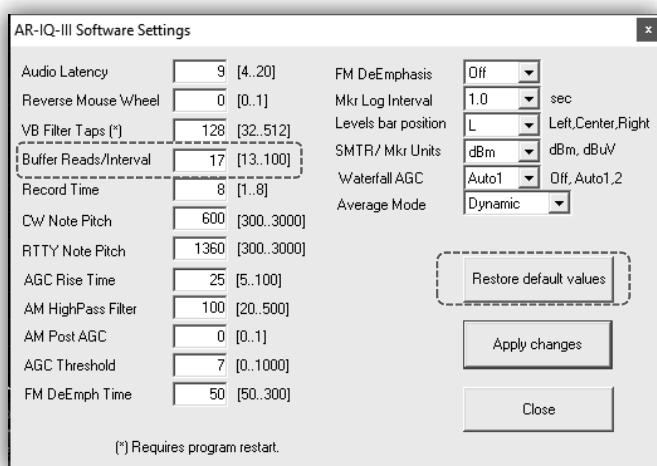
**NOTE:** The Spike Rejection function introduces a small amount of (soft) audio distortion which is tolerable in SSB/CW communications and should not be activated for digital modes which may be far more sensitive than human hear to nonlinear distortions. Use this function only when required.

## Advanced parameters & reset

Advanced settings are only for advanced users. Do only change its values if you really know what you are doing!

To access:

- Click on the blue icon
- Click on the “Software Settings” tab.



### RESET:

To restore default values, click this button followed by the “apply changes” button.

## Troubleshooting “audio stuttering”:

If you notice “audio stuttering” due to insufficient PC resources, it is possible to adjust the software’s “**Buffer Reads/Interval**” to match your PC’s specifications.

This parameter controls the amount of data that the software reads from its data queue in a given time interval. If you increase it you will allow the software to read more data from the queue and this will prevent that the queue overflows causing audio stuttering.

Possible values are from 13 to 100. Default is 17. The higher the value, the less CPU power is needed, however it also degrades the vide refresh rate. If audio stuttering is noticed, try to increment this value by 1 and press “Apply changes” and continue to increment until audio is normal.

## 14. AR5700D SPECIFICATIONS

<b>Frequency range</b>	9kHz~3.7GHz
<b>Tuning steps</b>	1Hz~999.999kHz
<b>Operation modes</b>	VFO (A~E), memory channel, memory channel scan, select scan, program search, FFT search (cyber search), analog video demodulation
<b>Analog receive modes</b>	FM, FM-stereo, AM, synchronous AM, USB, LSB, CW, analog I/Q, FM video.
<b>Digital receive modes</b> (encrypted signals not supported)	D-STAR / GMSK / AMBE DV mode only YAESU / C4FM / AMBE+2 V/D narrow mode only ALINCO / GMSK / AMBE EJ47 (F1E) mode only D-CR / C4FM / AMBE+2 NXDN / C4FM / AMBE+2 6.25kHz mode only P25 Phase 1 / C4FM / IMBE Conventional mode only dPMR / C4FM / AMBE+2 Tier 1 only DMR / C4FMx2 / AMBE+2 Tier 1 and Tier 2 only TETRA direct mode (T-DM) / $\pi/4$ shift QPSK / ACELP TETRA traffic channel (T-TC) / $\pi/4$ shift QPSK / ACELP
<b>Number of VFO's</b>	5
<b>Memory channels</b>	2000 (50 channels x 40 memory banks). Banks customizable from 5 to 95 channels.
<b>Priority channel</b>	1
<b>Select memory channels</b>	100 (via memory banks)
<b>Search banks</b>	40
<b>Pass frequencies</b>	1230 (30 per memory bank + 30 for VFO search)
<b>Typical scanning speed</b>	100 channels / steps per second (for analog modes)
<b>Temperature range</b>	0°C~+50°C (32°F~122°F)
<b>Frequency stability</b>	0.1ppm (after 5 min. warm-up) or 0.01ppm with optional GPS unit.
<b>Power requirements</b>	DC10.7V~16V (2.0A@12V)
<b>Audio output</b>	>1.5W into 8Ω load
<b>Current consumption</b>	Stand-by: Approx. 200mA, Max. audio: Approx. 1.8A
<b>Grounding method</b>	Minus grounding
<b>Dimensions</b>	Approx. 304mm(D) x 220mm(W) x 97mm(H) (excluding projections)
<b>Weight</b>	Approx. 5kg
<b>Circuit type</b>	9kHz~25MHz: Direct conversion 25MHz~3.7GHz: Double super heterodyne
<b>Intermediate frequencies</b>	First: 321.95MHz / 412.05MHz Second: 45.05MHz
<b>Demodulation method</b>	Digital signal processing
<b>IF filter bandwidths</b>	200Hz, 500Hz, 1kHz, 3kHz, 6kHz, 15kHz, 30kHz, 100kHz, 200kHz (choice is mode dependent) Automatically selected and non-changeable for digital modes.



<b>Selectivity (typical values)</b>	CW 500Hz      380Hz (>-3dB) 500Hz (<-60dB) AM 6kHz        5.5kHz (>-3dB) 6.9kHz (<-60dB) SSB 3kHz       2.7kHz (>-3dB) 3.1kHz (<-60dB) NFM 15kHz     14.2kHz(>-3dB) 15.6kHz(<-60dB) WFM 200kHz   200kHz (>-3dB) 250kHz (<-60dB)
<b>IIP3 (typical values)</b>	14.1MHz      +20dBm Preselector off 50MHz        +6dBm Preamp off 620MHz       +5dBm Preamp off 1250MHz      +3dBm Preamp off 2450MHz      +3dBm Preamp off
<b>Spurious rejection (typical values)</b>	40kHz~25MHz >60dB Preamp off 25MHz~2GHz >60dB Preamp off 2.0GHz~3.7GHz >60dB Preamp off
<b>Noise figure (typical values)</b>	25MHz~1GHz <12dB Preamp off 1GHz~2.75GHz <16dB Preamp off 2.75GHz~3.7GHz <16dB Preamp off

<b>Sensitivity</b>	<b>SSB 10dB S/N 3kHz</b>	<b>AM 10dB S/N 6kHz</b>	<b>NFM 12dB SINAD 15kHz</b>	<b>WFM 12dB SINAD 200kHz</b>
40kHz ~ 50kHz	<6.0μV	<15.0μV		
50kHz ~ 60kHz	<4.0μV	<10.0μV		
60kHz ~ 80kHz	<3.0μV	<7.0μV		
80kHz ~ 100kHz	<1.5μV	<4.0μV		
100kHz ~ 25MHz	<0.7μV	<2.0μV		
25MHz ~ 2.75GHz	<0.5μV	<1.0μV	<0.4μV	<1.5μV
2.75GHz ~ 3.7GHz	<0.7μV	<1.7μV	<0.6μV	<3.5μV

<b>Simultaneous reception:</b>	<b>(analog modes only)</b>
<b>Dual band reception</b>	One frequency below and one above 25MHz.
<b>Offset reception</b>	Main frequency + sub-frequency within +/-5MHz from main frequency. Over 25MHz only.
<b>Triple reception</b>	Combination of one HF frequency + offset reception
<b>Squelch modes</b>	CTCSS, DCS, data-mute
<b>Demodulation support</b>	Auto-notch filter (NOTCH), de-noiser (NR), noise blanker (NB), analog voice descrambler (SCR), IF shift (IF-SFT), CW pitch (CW PITCH), AGC, AFC, DTMF
<b>FFT features</b>	FFT search (cyber search), spectrum display

<b>Digital signal info display:</b>	
<b>D-STAR</b>	Call sign (sender & repeater)
<b>D-CR</b>	User ID, 15-bit scramble code
<b>NXDN</b>	RAN code, 15-bit scramble code
<b>P25</b>	NAC code
<b>DMR</b>	Color code, slot number
<b>TETRA traffic channel</b>	Slot number

<b>Audio recording</b>	
<b>Types of recording</b>	Received audio recording / playback and logging via SD card.
<b>SD card compatibility</b>	SD or SDHC type, 256MB to 32GB. File system FAT 16 or FAT 32 only. MiniSD and microSD cards require an SD card adapter.
<b>File format compatibility</b>	Windows compatible WAV file format. RIFF (little-endian) data, WAVE audio, Microsoft PCM, 16-bit mono 17.578kHz.
<b>Recording time</b>	Approx. 8h of continuous recording per 1GB. Squelch synchronization possible to eliminate inactive time.
<b>Log recording</b>	Logs are written into the audio wav file and can be accessed and played back with a special PC utility.

<b>Inputs &amp; outputs:</b>	
<b>Antenna inputs (ANT1)</b>	25MHz~3.7GHz N-J socket 50Ω
<b>(ANT2)</b>	9kHz~3.7GHz N-J socket 50Ω
<b>10MHz reference input</b>	SMA-J socket Typical input +2dBm, 50Ω
<b>45.05MHz IF output</b>	BNC-J socket, 45.05MHz±7.5MHz Typical output: Antenna input + 10dB, 50Ω
<b>Digital I/Q output</b>	0.9MHz bandwidth via USB 2.0 compatible isochronous transfer. Use supplied PC software AR-IQ-III. USB type B socket
<b>Analog I/Q output</b>	12kHz offset output via 3.5mm stereo phone socket Mode: AIQ, via LINE socket
<b>LINE output</b>	3.5mm stereo phone socket. -10dBm (600Ω)
<b>Headphones output</b>	3.5mm stereo phone socket
<b>External speaker output</b>	3.5mm mono phone socket. (8Ω)
<b>(ACC1)</b>	8-pin miniature DIN socket for optional GP5001 GPS receiver unit.
<b>(ACC2)</b>	RJ-45 socket for optional antenna selector
<b>(AUX1)</b>	RS232C, 9-pin D-subminiature (male). For firmware updates and remote control per PC.
<b>(AUX2)</b>	8-pin miniature DIN socket for future applications.
<b>USB</b>	USB 1.1/2.0 compliant, USB type B socket. For remote control per PC.
<b>Analog video out</b>	RCA socket, 75Ω 1V p-p
<b>DC power input</b>	DC barrel socket (5.5/2.1mm), center positive

<b>Supplied accessories:</b>
AC power adapter, SD card, operating manual, PC control software with license dongle, two USB cables.

A list of optional accessories is available at: [http://www.aorja.com/accessories/receiver\\_accessories.html](http://www.aorja.com/accessories/receiver_accessories.html)

Specifications are subject to change without notice nor obligation.

## **FCC COMPLIANCE STATEMENT**

Changes or modifications to this device not expressly approved by AOR could void the user's authorization to operate this device.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation.

The scanning receiver in this equipment is incapable of tuning, or readily being altered, by the user to operate within the frequency bands allocated to the Domestic Public Cellular Telecommunications Service in the Part 22.

**WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy; and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC ID: NVJAR5700D**

## **ISED COMPLIANCE STATEMENT**

The scanner receiver is not a digital scanner and is incapable of being converted or modified to a digital scanner receiver by any user. This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

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

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3(B) / NMB-3(B)

**IC: 22833-AR5700D**





Authority On Radio Communications

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