

# LAN-IQ SDR Graphic User Interface description

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## 1. Main screen, BB spectrum

The two screenshots of Main menu screen as provided on Figure 1-1 for AM mode and Figure 1-2 for WFM mode.

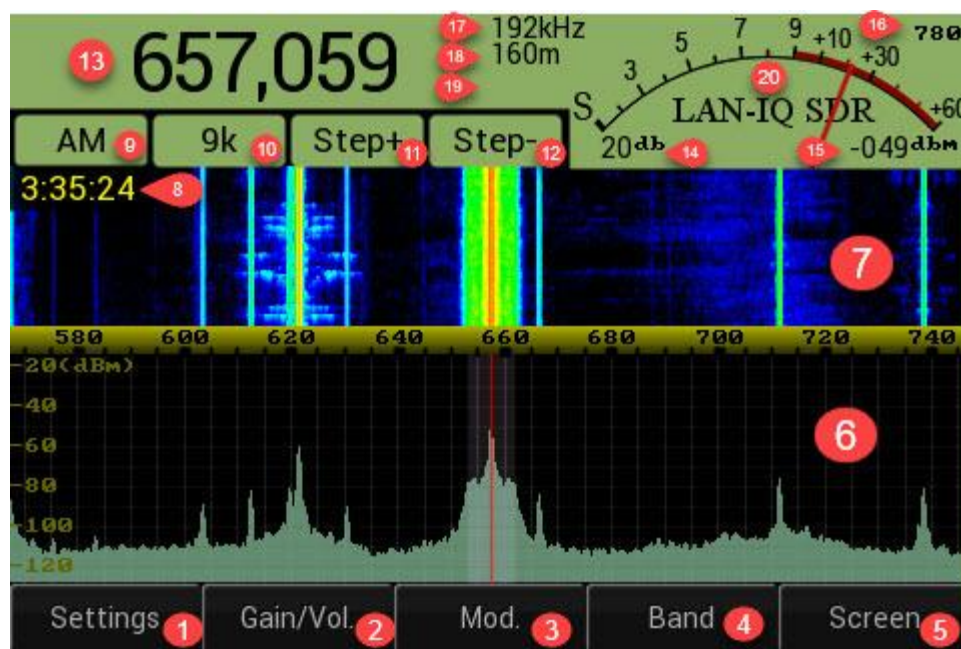


Figure 1-1 Main screen BB spectrum AM mode

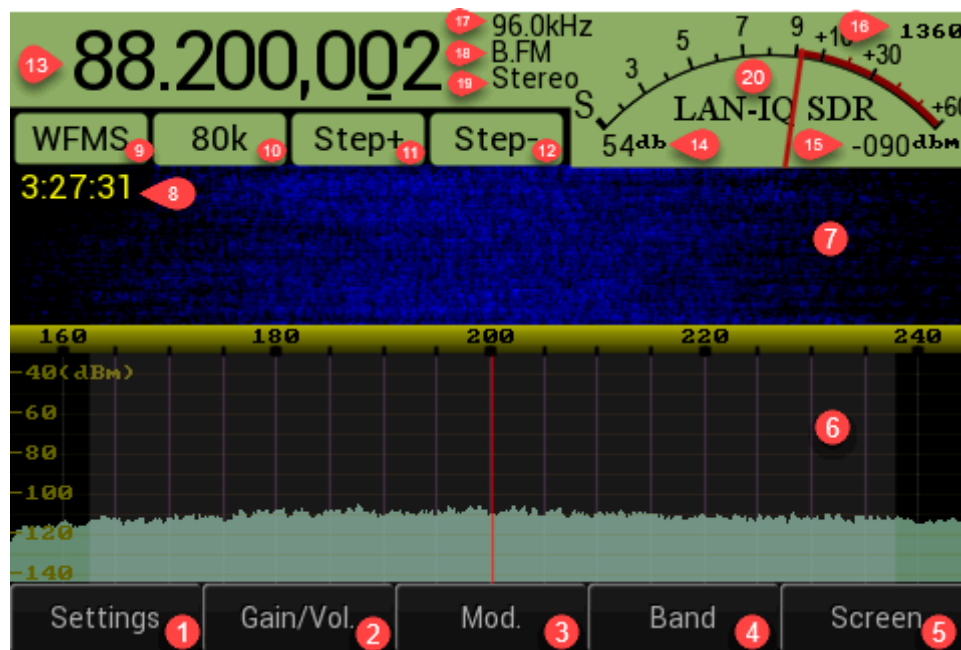


Figure 1-2 Main screen BB spectrum WFM mode

The Main screen has Graphic User Interface (GUI) elements that is listed below, all listed elements are “clickable” – i.e. there is reaction when user touching screen area where element is located:

**Table 1-1 Main screen GUI ( Figure 1-1, Figure 1-2 )**

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"Settings" menu	Press (touch)	touch invites "Settings screen", that is described in "Settings screen" chapter 2
2	"Gain/Value" menu	Press (touch)	"RF Gain / Audio volume" submenu Figure 3-1, when central frequency is located in HF range.  "LNA/Mixer Gain / Audio volume" submenu Figure 3-2 . See more details in chapter 3. Gain/Vol. controls, when central frequency is located in VHF/SHF range, touch on this area calls
3	"Mod." Menu	Press (touch)	Modulation submenu, described in the chapter 4
4	"Band" menu	Press (touch)	Band , Memory structure and submenu, chapter 5
5	"Screen" menu	Press (touch)	Screen settings submenu, chapter 6
6	Panoramic spectrum area	Movement of pressed touch-pen in left/right direction	Causes LO frequency tuning , frequency is decreased when moving from left to right and increased when moving in opposite direction. Minimal frequency change step is controlled by "Step+"(11)/"Step-"(12) knobs
7	Waterfall spectrum area	Press (touch)	Quick LO frequency tune (shift) to the frequency related to the pressed point X coordinate (inside RX bandwidth).
8	Current time	-	Shows current time
9	Modulation button	Press (touch)	Same as described for element 3, i.e.: Modulation submenu, described in the chapter 4
10	RX bandwidth button	Press (touch)	Change the current reception bandwidth, the behavior or bandwidth depends on the current modulation mode.  If one of Digital mode is used , the Digital modes submenu is called (chapter 4.2)
11	Step+	Press (touch)	Increase x10 frequency tuning step
12	Step-	Press (touch)	Decrease /10 frequency tuning step

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
13	Frequency Indicator	Press (touch)	<p>Calls direct numeric frequency input from touch keyboard.</p> <p>See: Frequency input , chapter 7</p>
14	RF Gain Indicator	-	<p>Shows summary RF gain value (in dB) , that depends on frequency range:</p> <ul style="list-style-type: none"><li>- For HF bands – it is VGA Gain</li><li>- For VHF/SHF bands it is sum of “LNA Gain” + “MIX Gain” + “VHF VGA Gain”</li></ul>
15	Signal Power	-	<p>Shows RMS RF signal power (dBm), measured for reception bandwidth (i.e. modulation/bandwidth dependent). It is numeric representation of the value shown on analog S-meter scale.</p>
16	DSP processing time	-	<p>Shows time (in uS) spent by DSP for one standart data packet processing (i.e. 1-packet that contains 960 complex I/Q samples) . Less number is better.</p> <p>Used only for debug purposes.</p>
17	Sample rate	-	<p>Shows current data processing sample rate</p>
18	Band / Memory cell indicator	-	<p>Shows current RX band or memory cell address.</p> <p>Value like 160m or 2m means standard HAM radio band, B.FM – means Broadcast FM band (88-108MHz).</p> <p>Value like M22 – mean frequency stored in memory cell number 22.</p> <p>Value like M22+90 means transverter mode indication (external frequency transverter is used before SDR) , in this case the SDR LO is tuned to the frequency stored in memory cell <b>M22</b>, but on Frequency indicator you will see sum of the “LO frequency” + “1-st (external) heterodyne frequency”, that is stored in memory cell <b>90</b>. See more explanations in Memory submenu, chapter 5.3</p>

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
19	Additional Digital Signal processing info.	-	<p>Can indicate additional information about signal processing procedures / modes (if enabled).</p> <p>The possible value of this field:</p> <p>Mono, Stereo – applied to broadcast WFM reception mode.</p> <p>NR – Noise Reduction processing, if enabled.</p> <p>A.NF – Automatic Notch Filter, if enabled.</p> <p>See more in Modulation submenu, chapter 4</p>
20	Analog S-Meter	-	<p>Shows signal strength according to S-scale,</p> <p>Same as for element 15 in this table.</p>

## 2. Settings screen



Figure 2-1 Settings screen

Table 2-1 Setting screen

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"Network" button	Press (touch)	Calls Network settings screen
2	"Audio" button	Press (touch)	Calls Audio settings screen
3	"Time" button	Press (touch)	Calls Time settings screen
4	"VHF" button	Press (touch)	Calls VHF screen
5	"About" button	Press (touch)	Calls About screen

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
6	"Rotate screen" button	Press (touch)	<p>Rotates image on LCD screen 180 degrees relatively to it's current orientation. Sometimes there can be calibration screen, right after "Rotate screen" pressed, so user will need to finish automatic calibration procedure. I.e. press three times on the blinking target that will appear in three different places on LCD screen.</p> <p>If needed the LCD-touch calibration procedure can be started intentionally using <a href="#">SDR Network Control box</a> utility "Filters"-&gt;"LCD calibration".</p>

## 2.1. Network settings screen

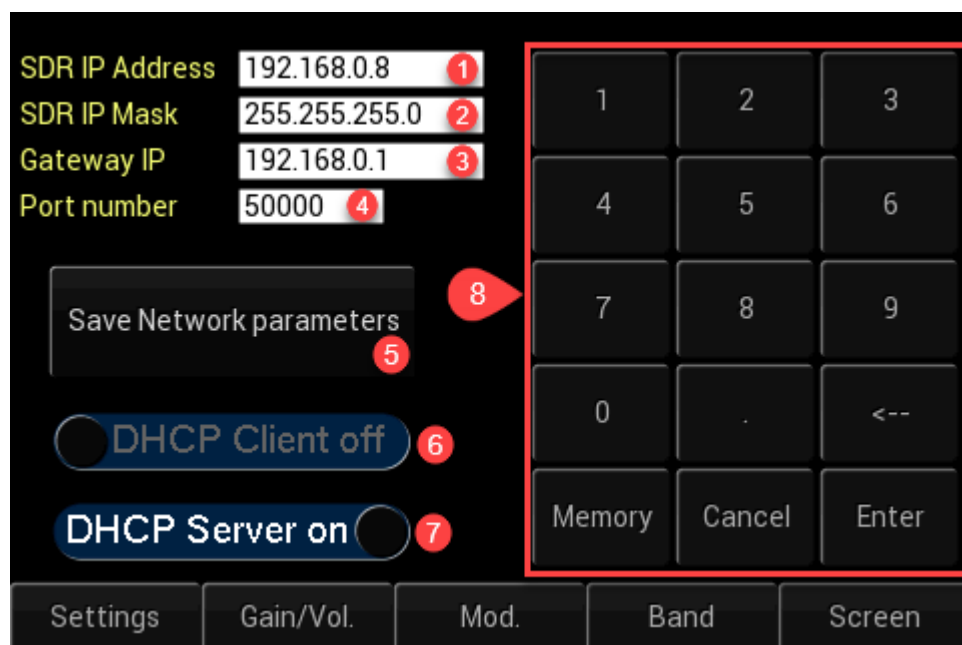


Figure 2-2 Network setting screen

**Table 2-2 Network settings (Figure 2-2)**

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"SDR IP address" edit box	Press (touch), numeric keyboard input	Allows to check or edit SDR's IP address using numeric keyboard
2	"SDR IP mask" edit box	Press (touch), numeric keyboard input	Allows to check or edit SDR's IP mask using numeric keyboard
3	"Gateway IP" edit box	Press (touch), numeric keyboard input	Allows to check or edit Gateway IP address using numeric keyboard
4	"Port number" edit box	Press (touch), numeric keyboard input	Allows to check or edit IP port number using numeric keyboard
5	"Save Network Parameters" button	Press (touch)	Save the current network parameters "IP address, mask, gateway IP" in LAN-IQ internal nonvolatile memory.  The new parameters will be actual only after SDR reset (power up).
6	"DHCP Client On (Off)"	Press (touch)	This switch box toggle the state of DHCP client , the state automatically saved into internal SDR nonvolatile memory, so last state will be actual also after reset (power up).
7	"DHCP Server On (Off)"	Press (touch)	This switch box toggle the state of DHCP Server in SDR, the state automatically saved into internal SDR nonvolatile memory, so last state will be actual also after reset (power up).



GUI Item number	GUI Item name	Touch screen action	GUI reaction description
8	Numeric keyboard	Press (touch)	<p>Keys: '1'-'0' and '.' are used to enter desired value of network parameters.</p> <p>Key "&lt;--" deletes latest entered value.</p> <p>Key "Memory" – is not actual in this context</p> <p>Key "Cancel" – exit "Network settings" screen and switch to the main screen, without any changes</p> <p>Key "Enter" – send command to save all Network parameters into internal SDR nonvolatile memory</p>

## 2.2. Audio settings screen

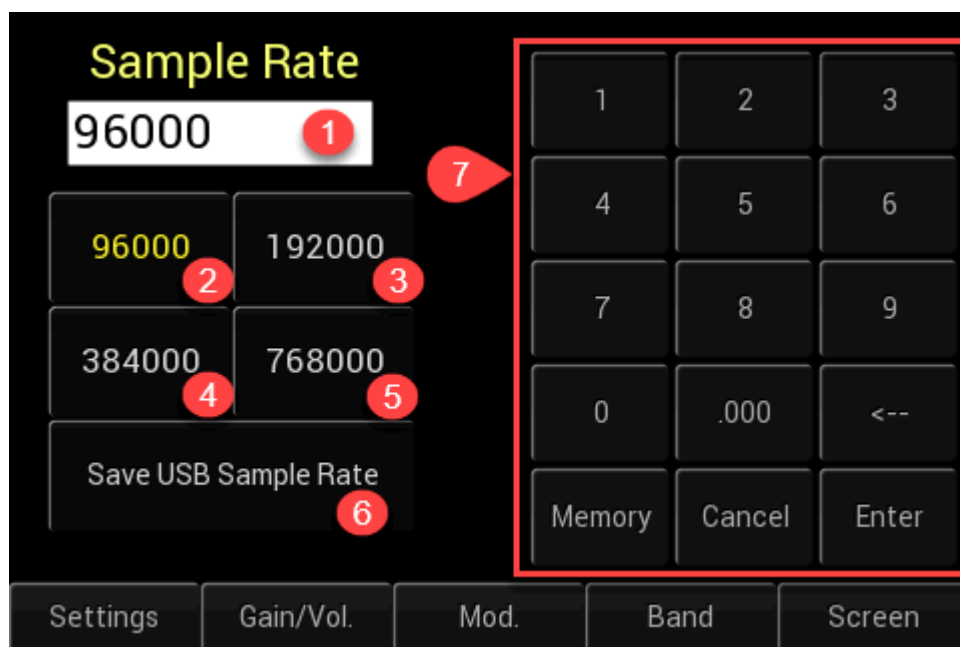


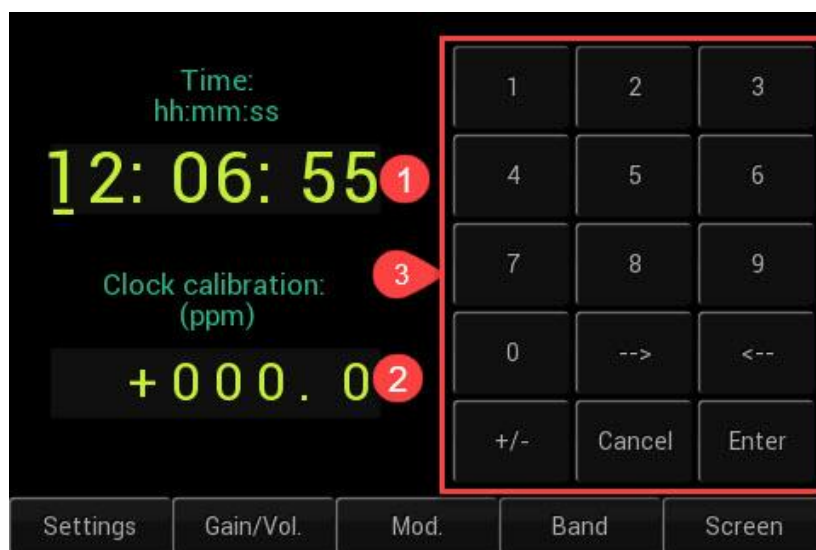
Figure 2-3 Audio settings screen

Table 2-3 Audio settings (Figure 2-3)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	Sample rate edit box	Press (touch), numeric keyboard	Allows to check or edit the RX sample rate using numeric keyboard .

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
		input	<p>Allowable sample rate value when SDR has correct decoding in Stand Alone mode should be one of the next 96000, 192000, 384000, 768000 Hz.</p> <p>If the sample rate is not matching listed above values, the sound quality of internal decoding can be poor</p>
2-5	Predefined Sample rate set keys	Press (touch)	Allows to change / set desired sample rate to one of predefined values – it is recommended ways to change sample rate in Stand Alone mode.
6	“Save USB sample rate” button	Press (touch)	<p>Save the desired sample rate value into LAN-IQ internal nonvolatile memory.</p> <p>The new parameter will be actual only after SDR reset (power up).</p> <p>For correct USB functioning the sample rate cannot be lower than 48000Hz and not higher than 250000 Hz. It is recommended to configure SDR to one of four standard values 96000, 192000, 384000, 768000</p>
7	Numeric keyboard	Press (touch)	<p>Keys: ‘1’-‘0’ are used to enter desired value of network parameters.</p> <p>Key ‘.000’ is used to enter sequence of three zeroes i.e. - 000</p> <p>Key “&lt;--” deletes latest entered value.</p> <p>Key “Memory” – is not actual in this context</p> <p>Key “Cancel” – exit “Network settings” screen and switch to the main screen, without any changes</p> <p>Key “Enter” – send command to save all Network parameters into internal SDR nonvolatile memory</p>

### 2.3. Time settings screen

**Figure 2-4 Time settings screen****Table 2-4 Time settings screen (Figure 2-4)**

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	Time clock edit box	Press (touch), numeric keyboard input	Allows to change the internal time clock using numeric keyboard .
2	Time clock calibration	Press (touch), numeric keyboard input	Allows to calibrate internal time clock rate.
3	Numeric keyboard	Press (touch)	Keys: '1'-'0' are used to enter desired value of network parameters.  Key "-->" - is used to shift edit cursor to the right  Key "<--" - is used to shift edit cursor to the left  Key "+/-" - is used to change clock correction (calibration) parameter sign  Key "Cancel" – exit "Network settings" screen and switch to the main screen, without any changes  Key "Enter" – send command to save all Network parameters into internal SDR nonvolatile memory

## 2.4. VHF screen

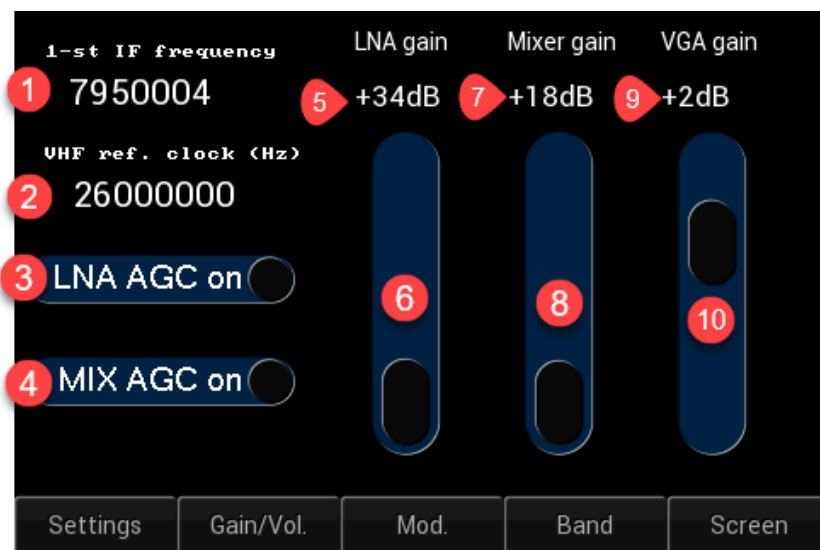


Figure 2-5 VHF settings screen

Table 2-5 VHF settings (Figure 2-5)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	1-st IF of VHF/SHF Front End	-	Shows 1-st IF value of VHF/SHF Front End, it can be different depending on LO frequency value
2	VHF reference clock	-	Shows VHF Front End reference clock value
3	LNA AGC On (Off) switch box	Press (touch)	Switch On/Off LNA AGC for VHF Front End, after reset or power up LNA AGC is in On state.  LNA Gain control is active only if LNA AGC is in Off state.
4	MIX AGC On (Off) switch box	Press (touch)	Switch On/Off MIX AGC for VHF Front End, after reset or power up MIX AGC is in On state.  MIX Gain control (set) is active only if MIX AGC is in Off state.
5	LNA Gain value	-	Shows LNA Gain value of VHF Front-End
6	LNA Gain regulator	Press (touch), drag	Used to control (set) LNA Gain level of VHF Front-End, active only if only if LNA AGC is turned Off.
7	MIX Gain value	-	Shows LNA Gain value of VHF Front-End

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
8	MIX Gain regulator	Press (touch), drag	Used to control (set) MIX Gain level of VHF Front-End, active only if only if MIX AGC is turned Off.
9	VGA Gain value	-	Shows VGA Gain value of VHF Front-End
10	MIX Gain regulator	Press (touch), drag	Used to control (set) VGA Gain level of VHF Front-End.

## 2.5.About screen

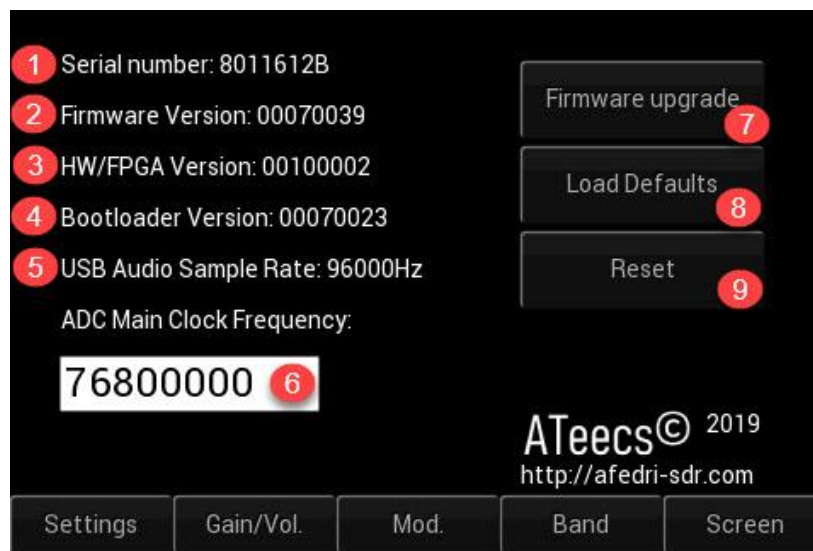
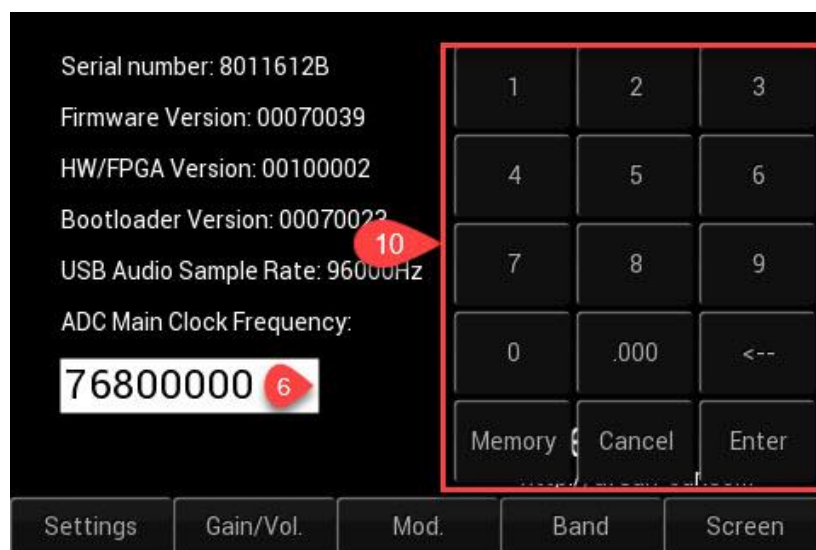


Figure 2-6 About screen



**Figure 2-7 About screen (numeric input)**

**Table 2-6 About screen (Figure 2-6, Figure 2-7)**

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	Serial number	-	Shows serial number of SDR
2	Firmware version number	-	Shows firmware version
3	HW/FPGA version	-	Shows HW and FPGA version of SDR
4	Bootloader version	-	Shows bootloader version
5	USB Audio sample rate	-	Shows sample rate that will be used by PC drivers , when USB connection is used for data transfer
6	ADC Main clock Frequency edit box	Press (touch), numeric keyboard input	Shows ADC clock frequency, i.e. frequency that is input RF signal is sampled by SDR. This edit box allows also to change (save) the new main clock value into SDR internal nonvolatile memory.
7	"Firmware upgrade" button	Press (touch)	When user press this button GUI will switch to special warning screen. After some time delay, if not canceled, the firmware upgrade procedure will began and SDR will enter to bootloader GUI...  More information about firmware upgrade procedure can be found in the next document: <a href="#">"AFEDRI SDR-Net short user manual"</a>

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
8	"Load Defaults" button	Press (touch)	When user press this button, the SDR will reset some parameters that are stored in nonvolatile memory by default one, the parameters that are affected are related to SDR start-up frequency, screen mode, bands table etc.
9	"Reset" button	Press (touch)	Press on this button cause SDR hardware reset procedure (similar to power up conditions)
10 (see Figure 2-7)	Numeric keyboard	Press (touch)	<p>Keys: '1'-'0' are used to enter desired value of network parameters.</p> <p>Key '.000' is used to enter sequence of three zeroes i.e. - 000</p> <p>Key "&lt;--" deletes latest entered value.</p> <p>Key "Memory" – is not actual in this context</p> <p>Key "Cancel" – exit "About" screen and switch to the main screen, without any changes</p> <p>Key "Enter" – send command to save ADC main clock frequency</p>

### 3. Gain/Vol. controls

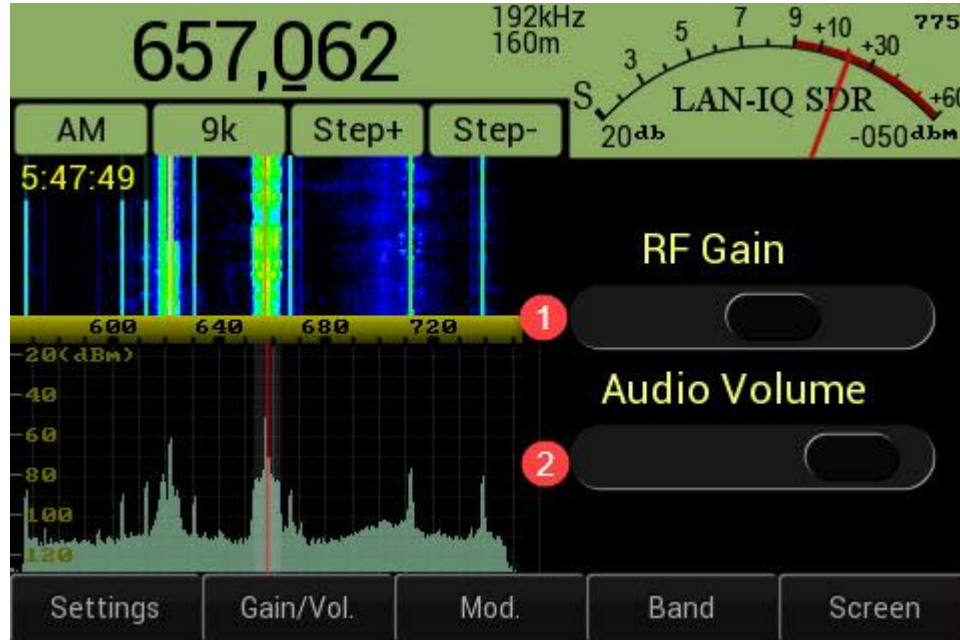


Figure 3-1 Gain/Vol. control menu (for HF bands)

Table 3-1 Gain/Voume control for HF bands (Figure 3-1)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"RF Gain" slider control	Press (touch), drag	Change (Set) "RG Gain" level of HF VGA
2	"Audio Volume" slider control	Press (touch), drag	Change (Set) "Audio Volume" level of headphones



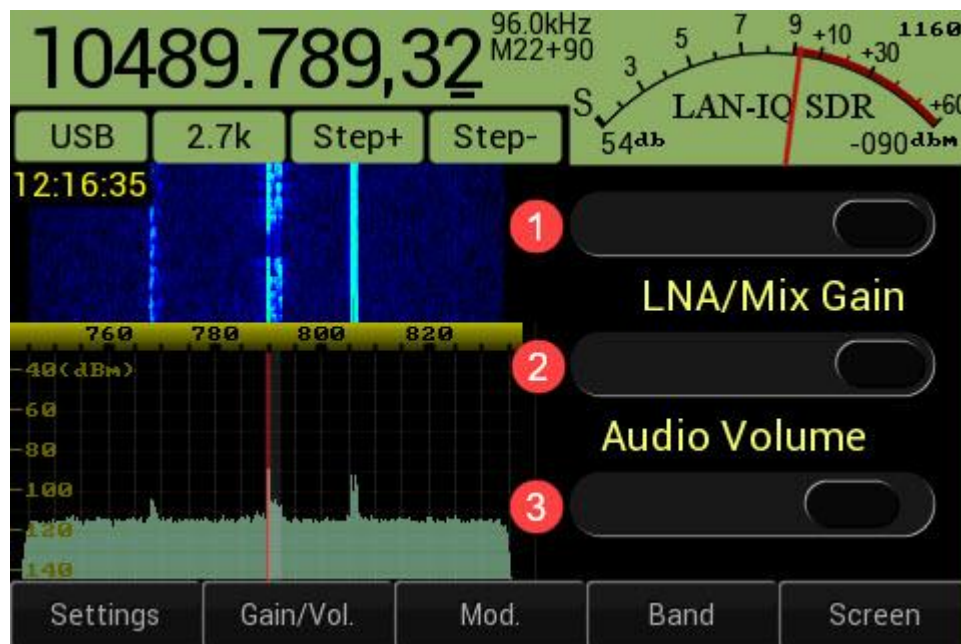


Figure 3-2 Gain/Vol. control menu (for VHF bands)

Table 3-2 Gain/Volume controls , for VHF/SHF bands (Figure 3-2)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"LNA Gain" slider control	Press (touch), drag	Gain of low noise amplifier of VHF/SHF Front-End gain. This control is available only if LNA AGC is switched off
2	"MIX Gain" slider control	Press (touch), drag	Gain of Mixer of VHF/SHF Front-End gain. This control is available only if MIX AGC is switched off
3	"Audio Volume" slider control	Press (touch), drag	Change (Set) "Audio Volume" level of headphones

## 4. Modulation submenu

This submenu allows to choose, change desired Modulation it can be analog or digital.

### 4.1. Analog modulations submenu

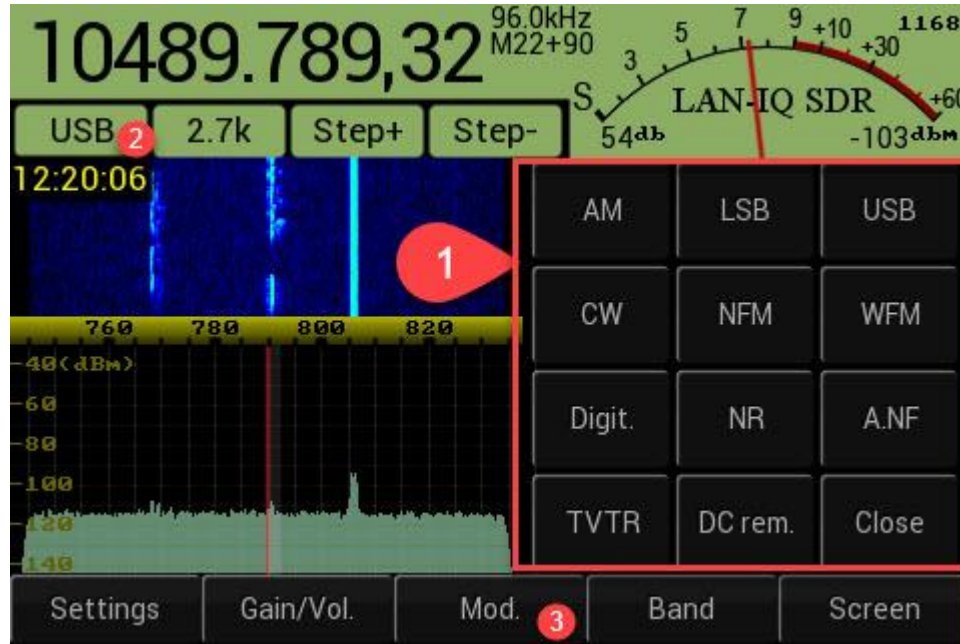


Figure 4.1-1 Analog modes submenu

Table 4.1-1 Analog modulation (Figure 4.1-1)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description	
1	Numeric keyboard	Press (touch)	AM	Amplitude Modulation
			LSB	Lower Side Band modulation
			USB	Upper Side Band modulation
			CW	CW (telegraph) modulation
			NFM	Narrowband Frequency Modulation (up to 25kHz)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description	
			WFM	Wideband Frequency modulation or Broadcast FM. Repeated press (click) on this button switch between WFM Stereo or Mono modes
			Digit.	Digital modulation modes BPSK, QPSK, RTTY modes decoders are supported, more information can be seen in the next table ().
			NR	Enable/Disable (toggle) DSP Noise Reduction
			A.NF	Enable/Disable (toggle) DSP Automatic Notch filter, i.e. automatic suppression of CW interference
			TVTR	Enable/Disable Transverter mode, in transverter mode the number that is shown on the Frequency indicator is composed by addition LO Frequency value + 1-st (external) Heterodyne frequency that is stored inside memory cells with addresses from 90-98.
			DC rem.	DC offset removal. Remove (filter) DC offset carrier located in the middle of spectrum
			Close	Close Mod. Keyboard.
2	Upper submenu – Mod. key	Press (touch)	Enable Mod. Keyboard	
3	Bottom Menu Mod. Key	Press (touch)	Enable Mod. Keyboard	

## 4.2. Digital modes submenu

LAN-IQ SDR has embedded decoder for some types of digital modulation modes, like BPSK, QPSK, RTTY. Digital modes submenu allows to choose desired mode and baud rate.

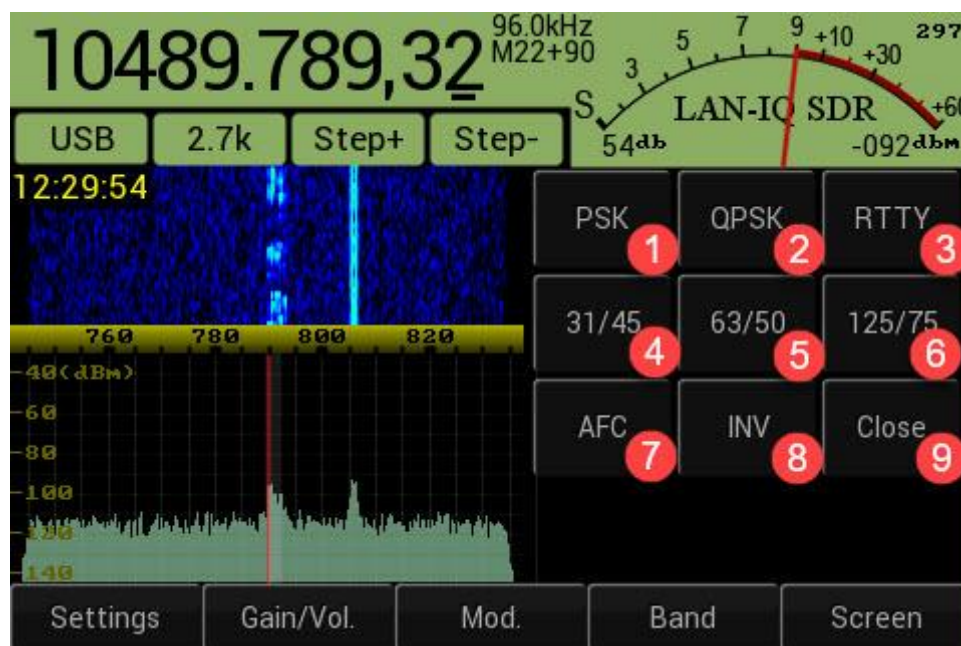


Figure 4.2-1 Digital modes submenu

Table 4.2-1 Digital modes (Figure 4.2-1)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"PSK" key	Press (touch)	Choose BPSK mode
2	"QPSK" key	Press (touch)	Choose QPSK mode
3	"RTTY" key	Press (touch)	Choose RTTY mode
4	"31/45" key	Press (touch)	In BPSK/QPSK mode – it choose 31 bit/s data transfer speed.  In RTTY mode choose 45 baud data transfer speed.
5	"63/50" key	Press (touch)	In BPSK/QPSK mode – it choose 63 bit/s data transfer speed.  In RTTY mode choose 50 baud data transfer speed.
6	"125/75" key	Press (touch)	In BPSK/QPSK mode – it choose 125 bit/s data transfer speed.  In RTTY mode choose 75 baud data transfer speed.

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
7	"AFC" key	Press (touch)	AFC – automatic frequency control, it is On by default, can be toggled On/Off by repeated press on this key
8	"INV" key	Press (touch)	Invert spectrum, actual for QPSK or RTTY modes
9	"Close" key	Press (touch)	Close this submenu

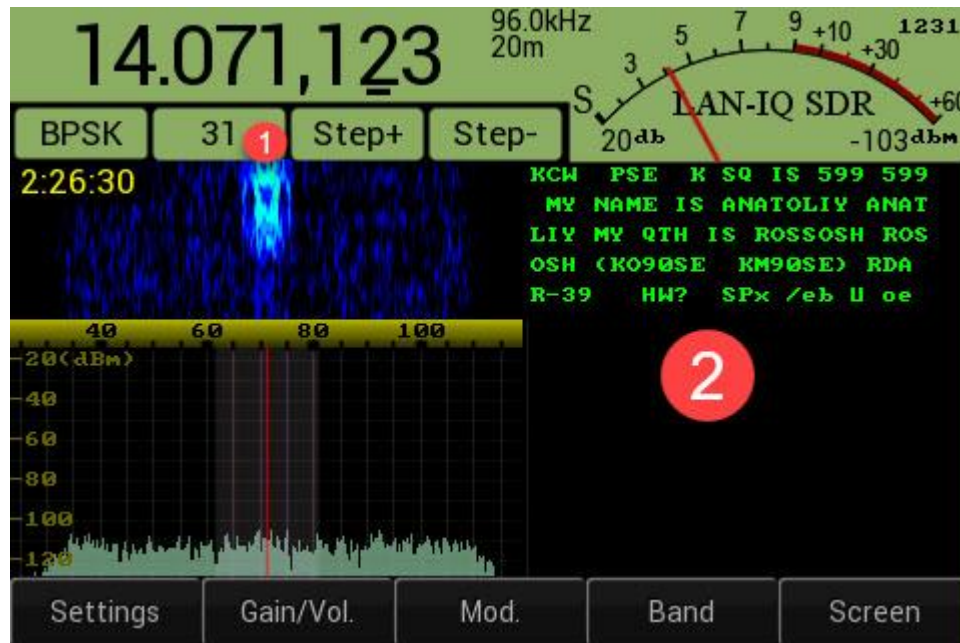


Figure 4.2-2 Digital modes terminal window

Table 4.2-2 Digital terminal window (Figure 4.2-2)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"Data rate" key	Press (touch)	Call Figure 4.2-1 Digital modes submenu
2	Terminal window	-	Print decoded text from digital transmission

## 5. Band , Memory structure and submenu

### 5.1. Memory cells structure

Frequency memory composed by 100 memory cells, that have address (numbering) from 0 up to 99. Every memory cell content can be modified using Memory submenu.

The cells addresses 0-13 are used to store standard HAM radio bands frequencies, every cell keep also information related to the latest used modulation and transverter mode state + address of the cell that used to save the 1-st heterodyne frequency.

The cells addresses 14-89 can be used to store frequencies in any range, every cell keep also information related to the latest used modulation and transverter mode state + address of the cell that used to save the 1-st heterodyne frequency.

The cells addresses 90-98 are used to store the value of 1-st heterodyne frequency , that applied when transverter mode is used.

The cell number 99 is used to keep current transverter memory cell address.

The more detailed memory cells information is described in the Table 5.1-1

**Table 5.1-1 Memory cells structure**

Memory cell address	Primary memory cell function		Comments
	Band name (as it is indicated on LCD)	Band's Frequency boundary (MHz)	
0	160m	1.700 - 2.500	Reserved to store frequencies related to used band, if user try to save into this cell number that is not matching bands boundary, this operation is ignored. It is possible to store (change) frequency only if the value is located inside band's boundary.
1	80m	2.500 - 5.500	
2	40m	5.500 - 8.500	
3	30m	8.500 - 12.000	
4	20m	12.000 - 16.500	
5	17m	16.500 - 19.000	
6	15m	19.000 - 22.500	
7	12m	22.500 - 25.500	
8	10m	25.500 - 33.500	

9	6m	33.500 - 65.000	
10	2m	120.000 - 170.000	
11	70cm	420.000 - 470.000	
12	23cm	1200.000 - 1300.000	
13	B.FM	65.000 - 120.000	
14-89	M14-M89	All frequencies	It is possible to store any number, latest used mode and transverter status
90-98	T90-T98 or Mxx+90 / Mxx+98 Where xx is value from 0 to 89	All frequency	Special dedicated cells, Used to store the 1-st heterodyne frequency value for transverter mode
99	-	90 - 98	Special dedicated cell , used to store the current transverter cell address, i.e. allowed value should be in 90-98 range

## 5.2. Band submenu

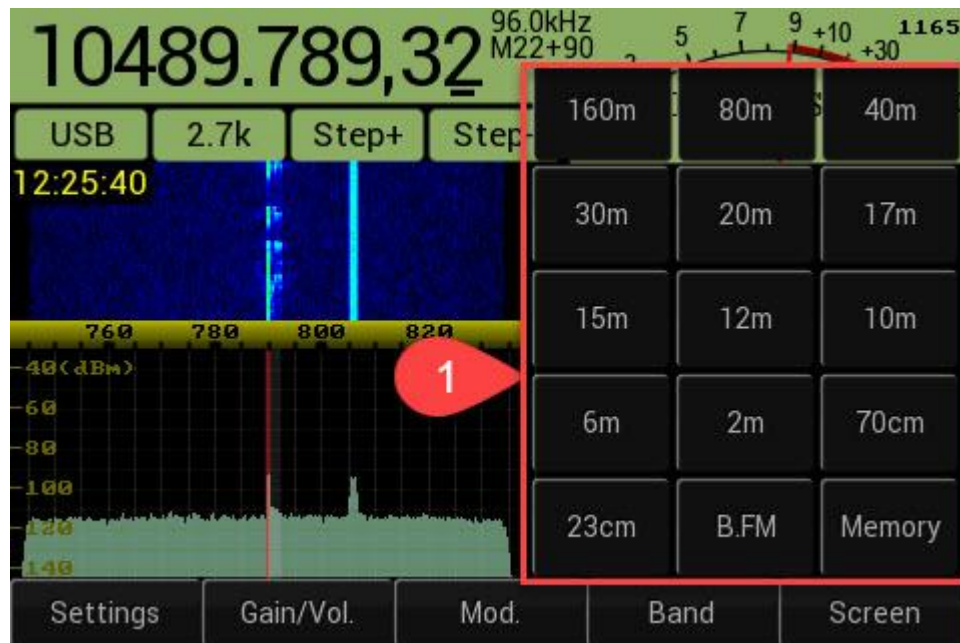


Figure 5.2-1 Band submenu

Table 5.2-1 Band submenu (Figure 5.2-1)

GUI Item number	Key name	Touch screen action	GUI reaction description
1	"160m" key	Press (touch)	Choose 160m HAM radio band, default frequency is mode dependent, example:  CW = 1820 kHz, SSB = 1890 kHz
1	"80m" key	Press (touch)	Choose 80m HAM radio band, default frequency is mode dependent, example:  CW = 3510 kHz, SSB = 3700 kHz
1	"40m" key	Press (touch)	Choose 40m HAM radio band, default frequency is mode dependent, example:  CW = 7010 kHz, SSB = 7070 kHz



GUI Item number	Key name	Touch screen action	GUI reaction description
1	"30m" key	Press (touch)	Choose 30m HAM radio band, default frequency is mode dependent, example:  CW = 10120 kHz, DIG = 10140 kHz
1	"20m" key	Press (touch)	Choose 20m HAM radio band, default frequency is mode dependent, example:  CW = 14010 kHz, SSB = 14150 kHz
1	"17m" key	Press (touch)	Choose 17m HAM radio band, default frequency is mode dependent, example:  CW = 18070 kHz, SSB = 18100 kHz
1	"15m" key	Press (touch)	Choose 15m HAM radio band, default frequency is mode dependent, example:  CW = 21010 kHz, SSB = 21205 kHz
1	"12m" key	Press (touch)	Choose 12m HAM radio band, default frequency is mode dependent, example:  CW = 24895 kHz, SSB = 24970 kHz
1	"10m" key	Press (touch)	Choose 10m HAM radio band, default frequency is mode dependent, example:  CW = 28010 kHz, SSB = 28490 kHz
1	"6m" key	Press (touch)	Choose 6m HAM radio band, default frequency is mode dependent, example:  CW = 50.050 MHz, SSB = 50.100 MHz
1	"2m" key	Press (touch)	Choose 2m HAM radio band, default frequency is mode dependent, example:  CW = 144.050 MHz, SSB = 144.350 MHz
1	"70cm" key	Press (touch)	Choose 70cm HAM radio band, default frequency is mode dependent, example:  CW = 432.050 MHz, SSB = 435.500 MHz
1	"23cm" key	Press (touch)	Choose 23cm HAM radio band, default frequency is mode dependent, example:  CW = 1296.010 MHz, SSB = 1296.100 MHz

GUI Item number	Key name	Touch screen action	GUI reaction description
1	"B.FM" key	Press (touch)	Choose Broadcast FM band, default frequency is: 88.200 MHz
1	"Memory" key	Press (touch)	Calls Memory submenu (Figure 5.3-1)

### 5.3. Memory submenu

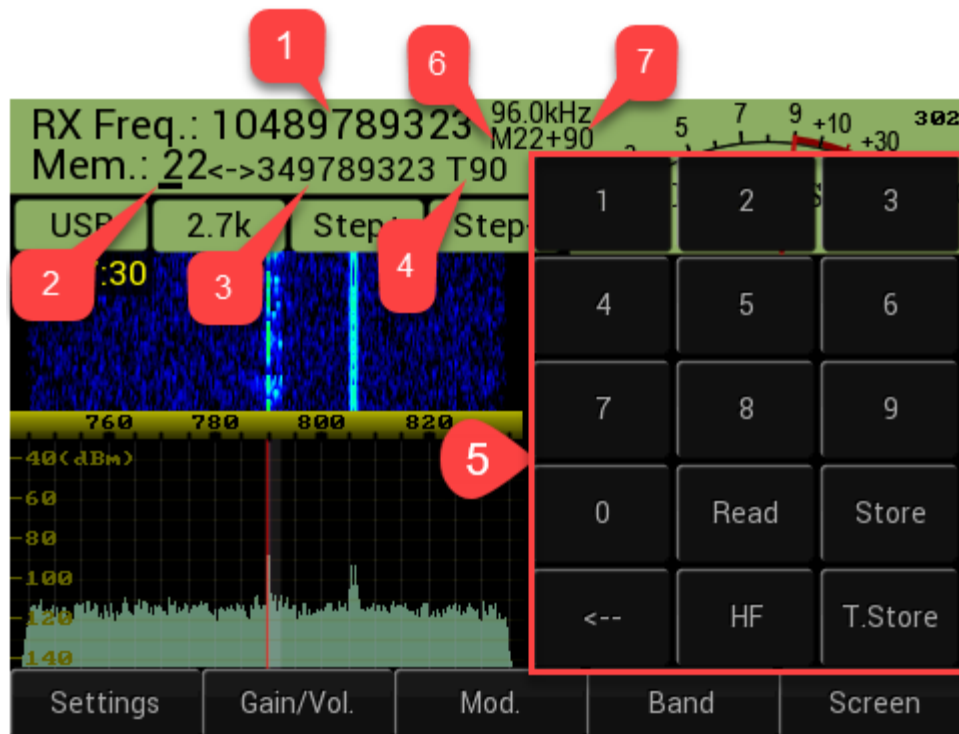


Figure 5.3-1 Memory submenu

Table 5.3-1 Memory submenu (Figure 5.3-1)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description

1	"RX Freq.:" box	-	Shows RX frequency, that in normal mode is same as LO (NCO) frequency, in transverter mode it is sum of LO frequency and 1-st (external) heterodyne frequency (that can be stored in special memory cell 90-98), the current pointer to active TVTR cell is stored in memory cell 99
2	"Mem.:"	-	Field <u>NUM</u> shows current memory cell address , desired memory address can be input from keyboard (element 5) it can have value from 0 up to 99 and when user input number from keyboard it wraps around
3	<u>Freq</u>	-	field <u>freq</u> shows memory cell content, i.e. stored frequency value in Herz, address is defined by "Mem.:" (see row above)
4	<u>TNUM</u>	-	field <u>NUM</u> , is actual for transverter mode only and shows memory cell address where 1-st (external) heterodyne frequency is stored

5	Numeric keyboard	Press (touch)	<p>Keys: '1'-'0' and '.' are used to enter desired value of network parameters.</p> <p>Key "&lt;--" deletes latest entered value.</p> <p>Key "Read":</p> <ul style="list-style-type: none"><li>- read memory cell content (cell address is defined by "Mem.:" field),</li><li>- set stored value as current LO frequency for SDR</li><li>- close this submenu</li></ul> <p>Key "Store" – save current LO frequency (or number previously entered from numeric keyboard) into the memory cell (cell address is defined by "Mem.:" field)</p> <p>Key "HF" – exit this submenu and enter to Bands submenu.</p> <p>Key "T.Store" – complex transverter mode save, when pressed it does next:</p> <ul style="list-style-type: none"><li>- Save current LO frequency (or number previously entered from numeric keyboard) into the memory cell (cell address is defined by "Mem.:" field)</li><li>- Save 1-st (external) heterodyne frequency into current transverter memory cell (address defined by <u>TNUM</u> field )</li></ul>
6	<u>MCELL</u>	-	Shows memory cell address that is used to store LO frequency that is used for current reception
7	<u>+CELL</u>	-	Shows special memory cell address that is used to store transverter 1-st heterodyne frequency that is used for current reception, actual in transverter mode

## 6. Screen settings submenu

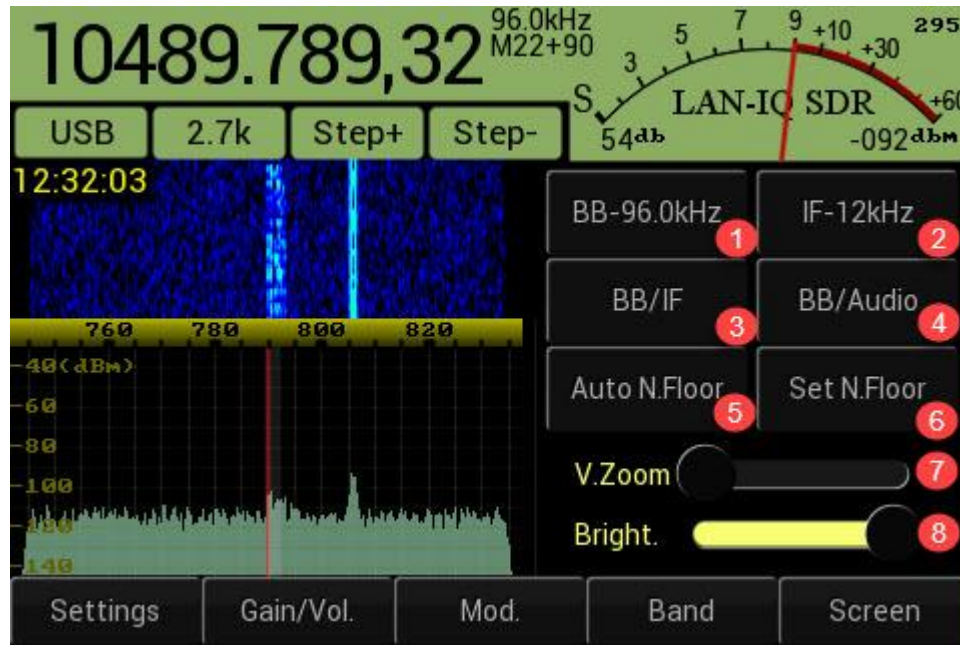


Figure 6-1 Screen settings

Table 6-1 Screen settings (Figure 6-1)

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	"BB-96.0kHz"	Press (touch)	<p>Choose the wide Base Band spectrum screen, see example on the Figure 6-2.</p> <p>The number 96.0kHz - means signal spectrum bandwidth, it can have different value and depends only on the SDR's sample rate.</p>
2	"IF-12kHz"	Press (touch)	<p>Choose the 2-nd IF spectrum screen, see example on the Figure 6-3.</p> <p>The number 12kHz - means 2-nd IF signal spectrum bandwidth, it can have different value and depends only on modulation type. It can be 12kHz for CW,SSB, AM and Digital modulation or 24kHz for NFM.</p> <p>For WFM mode 2-nd IF is not applicable, so instead of this spectrum the combined BB/IF spectrum is used (Figure 6-5)</p>

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
3	"BB/IF"	Press (touch)	<p>Choose combined Base Band / 2-nd IF spectrum display.</p> <p>Combined Spectrum composition depends on modulation type.</p> <p>For AM, CW, SSB, Digit. Modes it looks like on <b>Figure 6-4</b>, where BB spectrum is displayed on the left screen side, 2-nd IF on the right side.</p> <p>In the WFM mode the BB spectrum is displayed on the left screen side , on the right side the decoded Base band audio spectrum is displayed (<b>Figure 6-5</b>)</p> <p>BB bandwidth is defined by SDR sample rate</p>
4	"BB/Audio"	Press (touch)	<p>Choose combined Base Band / decoded Audio signal (<b>Figure 6-6</b>).</p> <p>The BB spectrum is displayed on the left screen side , when on the right side there is Audio spectrum of decoded signal.</p> <p>BB bandwidth is defined by SDR sample rate,</p> <p>Audio spectrum bandwidth is defined by modulation mode and bandwidth</p>
5	"Auto N.Floor"	Press (touch)	<p>Enable / Disable automatic noise floor level control, this control , when enabled - automatically makes optimal adaptation of panoramic spectrum scale lower limit relatively to signal noise level.</p>
6	"Set N.Floor" ("Reset N.Floor")	Press (touch)	<p>Manually one time procedure that calculate and set (or reset) noise floor level control, allows optimal adaptation of panoramic spectrum scale lower limit relatively to signal noise level.</p>
7	"V.Zoom"	Press (touch), drag	<p>Zoom vertical resolution of panoramic spectrum, it is recommended to use "Auto N.Floor" or "Set N.Floor" after zoom changes</p>
8	"Bright."	Press (touch), drag	<p>Control brightness of the LCD's backlight.</p>

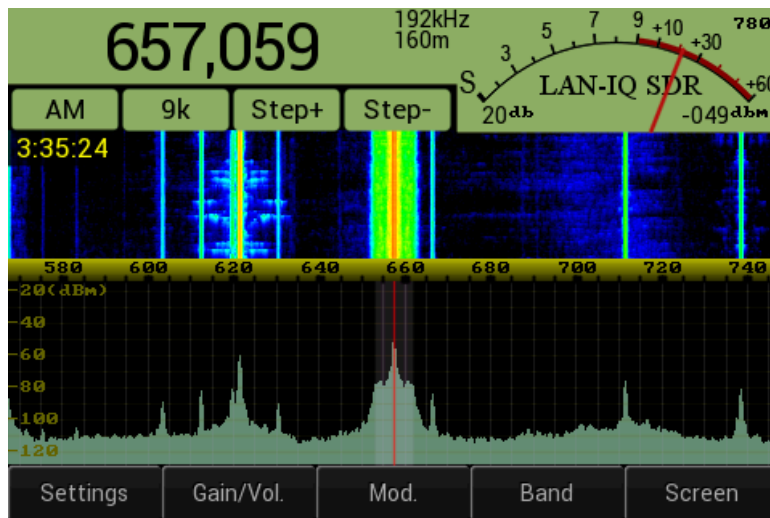


Figure 6-2 Base band spectrum (96kHz)

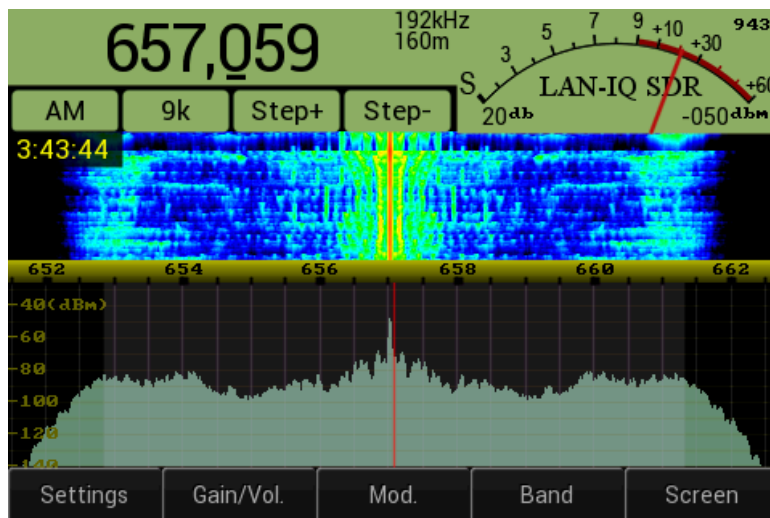


Figure 6-3 IF spectrum , AM modulation (12kHz)

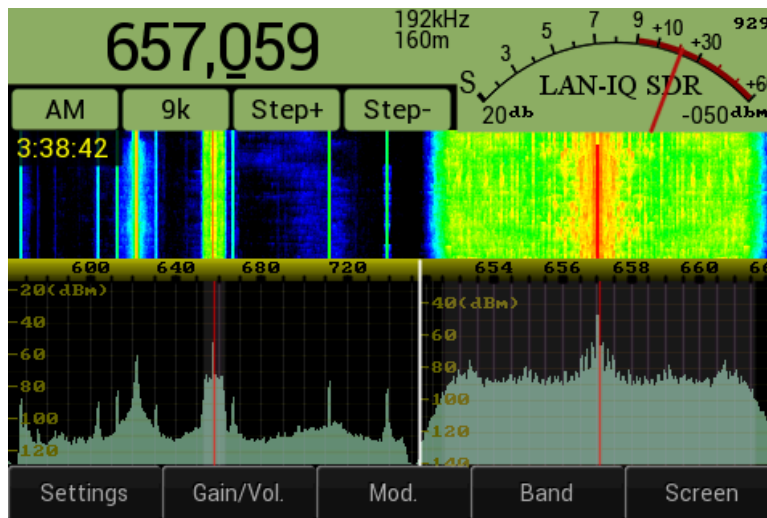


Figure 6-4 BB/IF spectrum, AM modulation

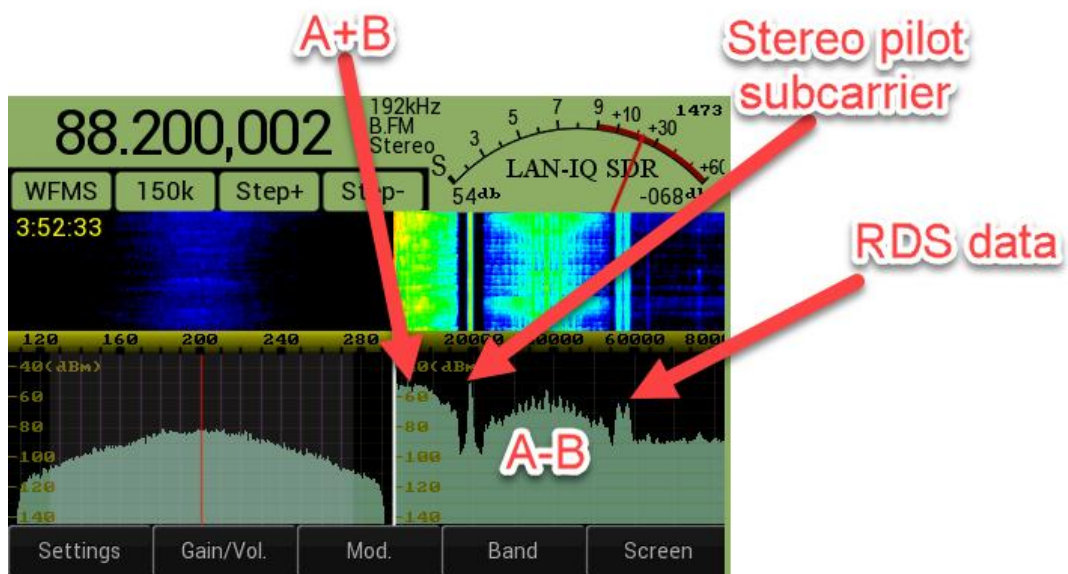


Figure 6-5 BB/IF spectrum for WFM modulation



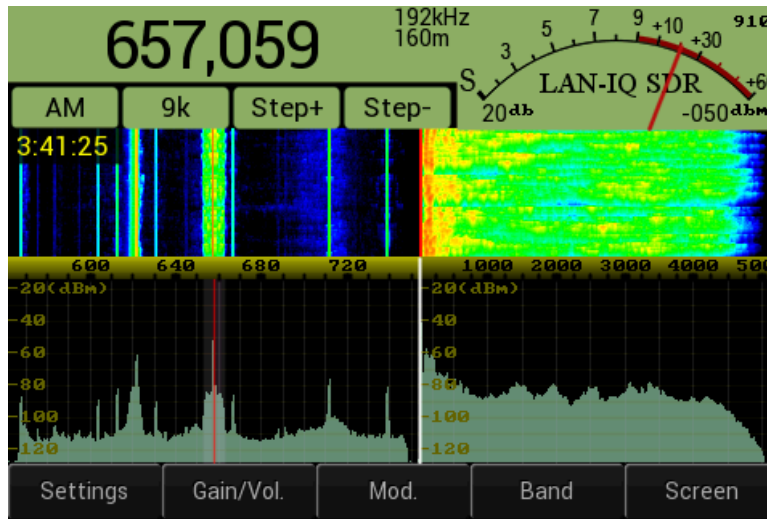


Figure 6-6 BB/Audio spectrum , AM modulation

## 7. Frequency input

LAN-IQ SDR has number options to set/change tuning frequency:

- Touch-pen moving in Panoramic Spectrum area left move increase LO frequency, right move decrease LO frequency, see (Figure 7-1, Figure 7-2)
- Touch-pen touching on waterfall area, will immediately tune LO frequency to defined by pointer horizontal coordinate, see (Figure 7-1)
- Direct frequency input from numeric keyboard. Direct frequency input is possible in special submenu that contains numeric keyboard (Figure 7-3). This submenu is available, when user touch Frequencny indicator area (Figure 1-1, element 13). In this case it is possible directly input desired frequency from keyboard and make it active pressing "Enter" key, or save the number into desired memory cell if user will press "Memory" key. Please see
- Choose LO frequency using Band or Memory submenu controls

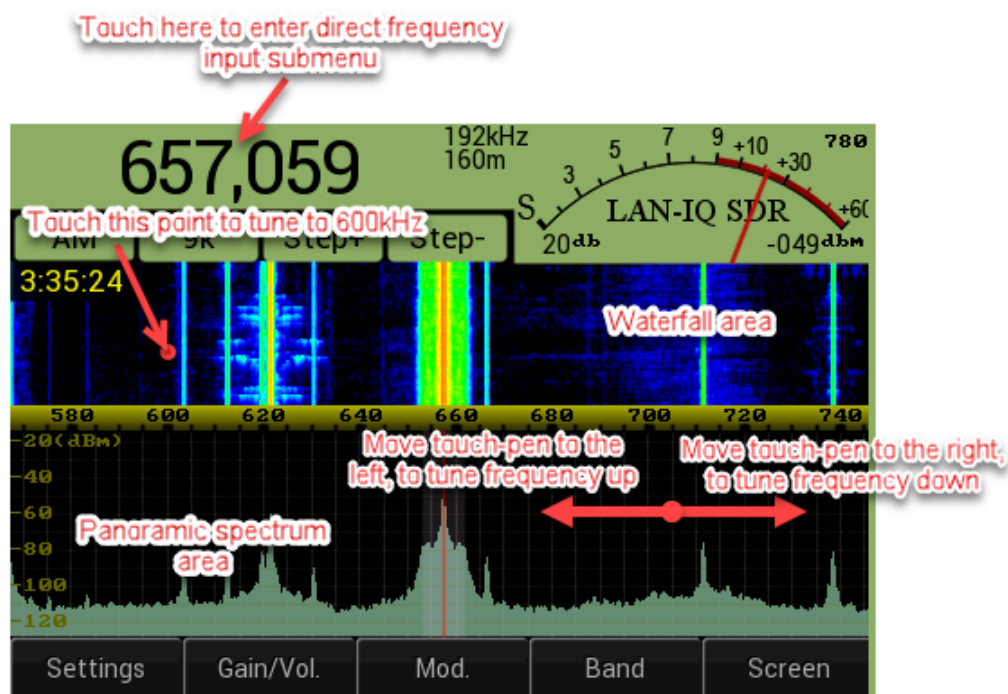


Figure 7-1 Touch pen frequency tuning (BB spectrum)

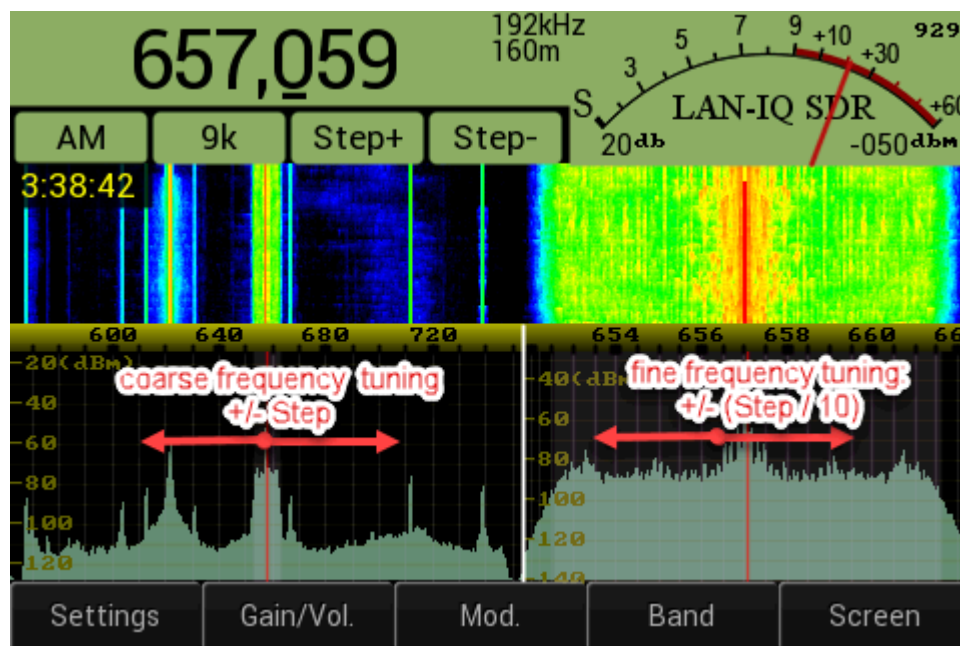
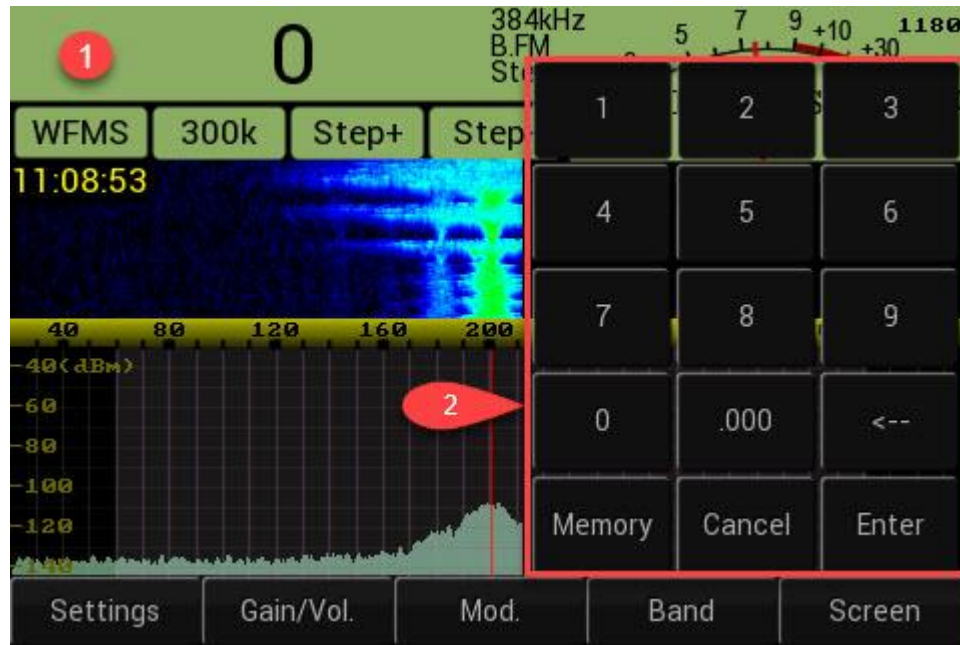


Figure 7-2 Touch pen frequency tuning (BB/IF spectrum)

**Figure 7-3 Direct Frequency input****Table 7-1 Direct frequency input**

GUI Item number	GUI Item name	Touch screen action	GUI reaction description
1	Frequency input edit box	Press (touch)	Touch in this area calls numeric keyboard
2	Numeric keyboard	Press (touch)	<p>Keys: '1'-'0' are used to enter desired value of network parameters.</p> <p>Key '.000' is used to enter sequence of three zeroes i.e. - 000</p> <p>Key "&lt;--" deletes last entered value.</p> <p>Key "Memory" – call "Memory submenu" (Figure 5.3-1, Table 5.3-1)</p> <p>Key "Cancel" – exit direct frequency input submenu, without any changes</p> <p>Key "Enter" – send command to set RX frequency according edit box content</p>

## 8. Manual Notch filter

In addition to Automatic notch filter (described in 4.1, Table 4.1-1) , LAN-IQ SDR has also Manual Notch filter.

Manual Notch (reject) filter function control is available on BB/Audio spectrum display (Figure 6-6, Figure 8-1). To enable notch filter user how to touch on desired waterfall spectrum point, the notch frequency can be tuned using same principle as LO frequency, i.e. left/right touch-pen move on Panoramic spectrum and/or point touch on waterfall spectrum, see Figure 8-1.

Manual notch filter can be disabled by tuning notch frequency to zero.

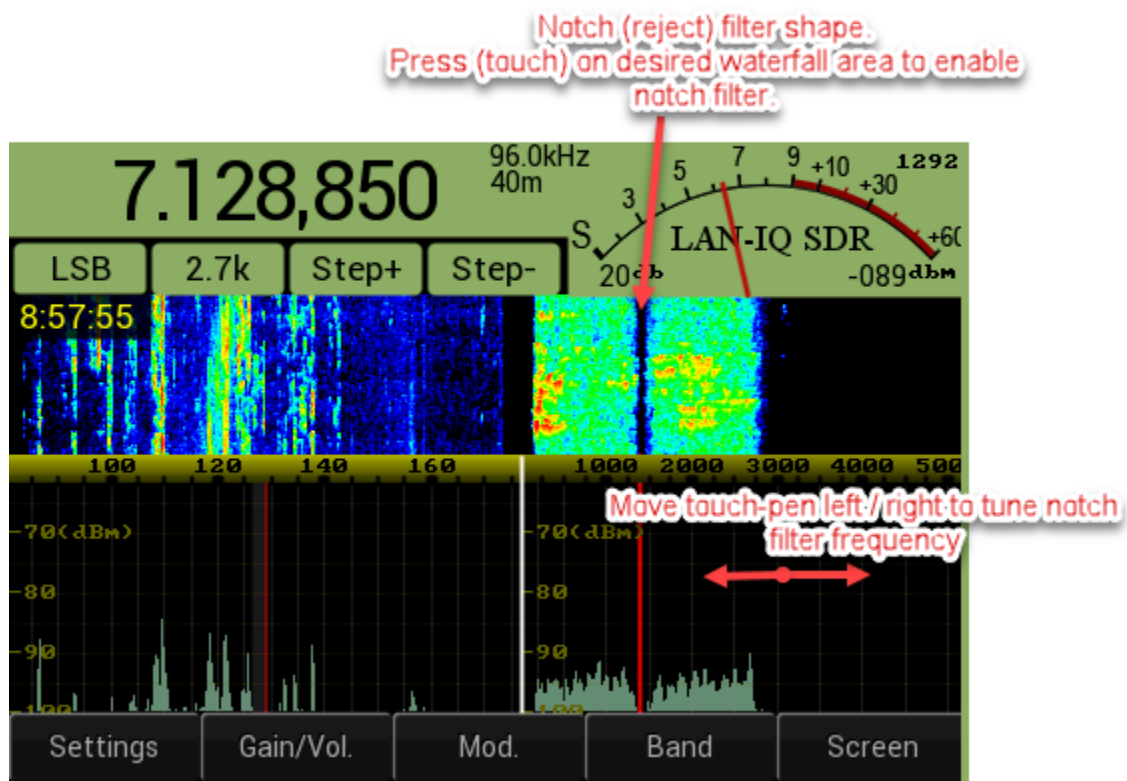


Figure 8-1 Manual notch (reject) filter