GOOZEEZOO MALAHIT-DSP1 Malachite Receiver

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Contents

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User Manual

Malachite Receiver

- (Model: MALAHIT-DSPl)

Product Profile

Product Function Introduction

- Frequency range: 50kHz-250MHz. 400MHz-2GHz
- Panoramic width: 160kHz, 80kHz, 40kHz
- Modulation type: AM. SSB, DSB, CW. NFM, WFM
- Sensitivity: 0.3uV up to 1 GHz
- Dynamic bandwidth: 82dB
- Antenna: 50 Ohm female female pin SMA connector

High impedance mode (DSP1 with optional board)

- Built-in preamplifier

- Power: S0OOmAh lithium-ion battery
- Software features: adjustable filter width
- Adaptive Noise Reduction (NR)
- threshold noise reduction
- Noise Blanker (NB)
- Automatic Gain Control (AGC)
- Automatic trap (ANF)
- Stereo FM Support RDS Analog Stereo
- equalizer
- Hardware features: STM 32H743 ARM CPU Frequency 480MHz
- MSi001 Multiband, Multimode Tuner
- 3.5 • 480×320 LCD high brightness capacitive touch screen
- Front cavity dual-diaphragm speakers
- IP6X Mechanical Encoders
- Pure aluminum alloy shell design

Product Specifications

- Product external size: 142mm*95mm*30mm
- Product weight (single machine): 500g (aluminum alloy shell)
- Packing list: Main unit x 1, SMA head trolley antenna x: 1, carrying strap x 1, stand x 1. Type-C cable x 1, user manual x 1, EVA bag x 1

Getting Started

Assemble the receiver, screw on and unfold the supplied tie rod antema, then toggle the power switch on the left side of the case, and you'll briefly see the power-up screen, then the main user interface screen.
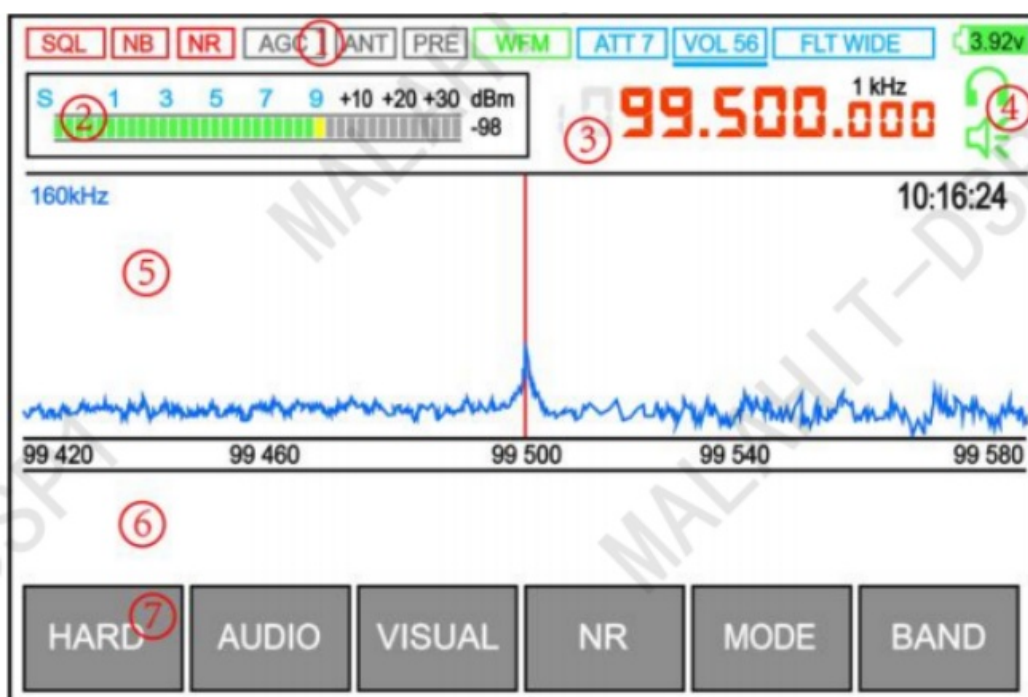
Introduction to the User Interface

From top to bottom. this screen contains the following sections:

1. Various indicator lights, discussed further in the documentation below;
2. Signal strength meter (S·meter);
3. Current tuning frequency and tuning step;
4. Headphone and speaker indicators;
5. Signal spectr um display. the spectrum shows the signal strength by frequency, and the straight line in the center is the current tuned frequency;
6. Signal waterfall display, a waterfall showing how the signal changes over time;
7. Menu buttons, discussed further in the documentation below.

Introduction to common operations

Entering the specified frequency: Touch the position of the frequency on the display and enter the specified frequency.
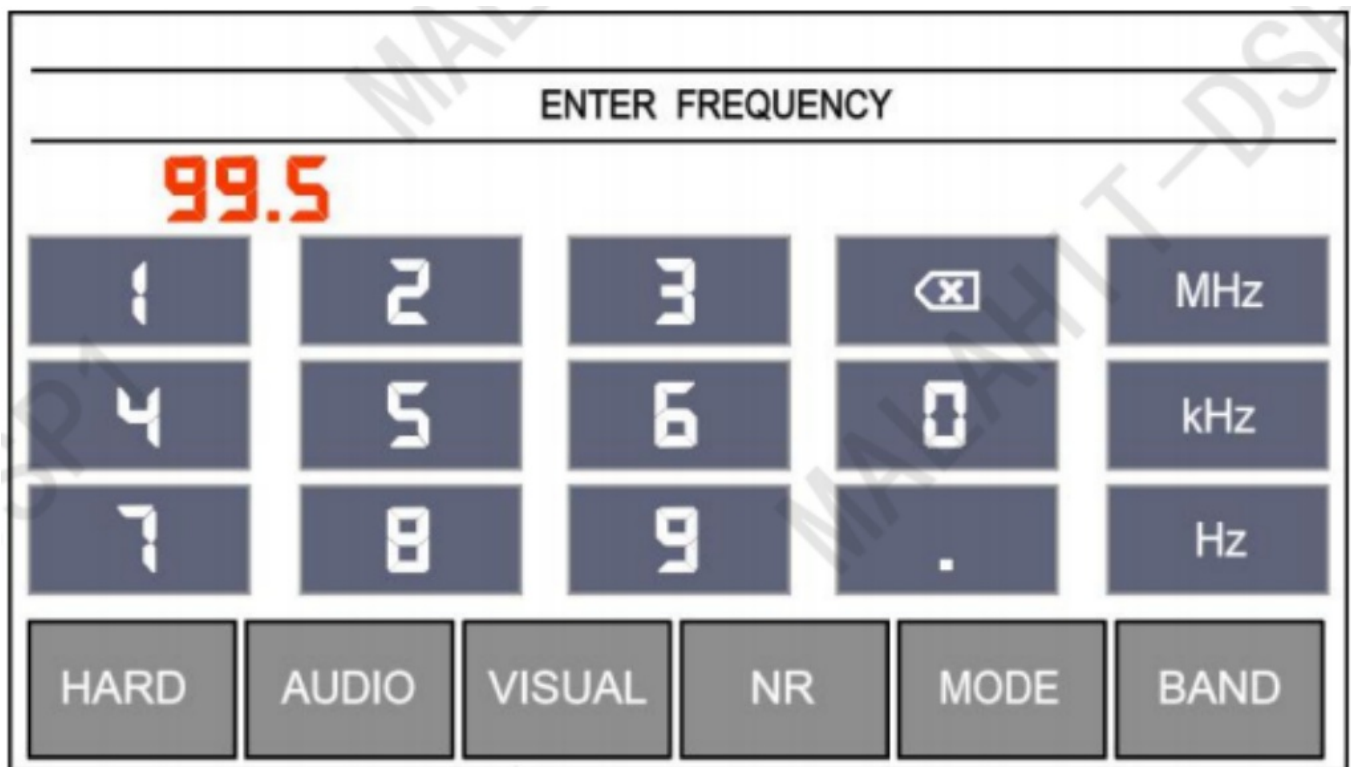
- To fine-tune the frequency: rotate the receiver's Frequency knob.
- To change the step value of the trim frequency: short press the Frequency knob, rotate it to change the step value, then short press the knob again to exit the step value setting.
- To change the volume: tum the Volume knob of the receiver.
- Quickly set ATT, VOL. PLT parameters: You can press the Volume knob briefly to make the knob function to switch between Volume VOL, Filter Width PLT and Attenuator ATT, rotate the Volume knob to call out the value you want.
- Change Panorama Width: Touch the waterfall display area to change the spectrum display bandwidth, the current spectrum display bandwidth is displayed in the upper left comer of the screen (160kHz, 80kHz, 40kHz). To change the modulation type: touch the MODE button and touch the screen to select a new modulation type, such as AM, WFM, NFM, LSB or USB.

- Quickly close the screen: tap the power button and tap it again it will open the screen.
- To turn off the receiver: press and hold the power button for a few seconds, the receiver will emit a series of Morse code beeps and then the receiver will turn off.
- Frequency knob, Volume knob other functions:
  - To disable the touchscreen, press and hold the Volume knob for a few seconds until the receiver beeps; disabling the touchscreen reduces shortwave interference; at this point the receiver can still be adjusted wrt:h the knob; press and hold the Volume knob again for a few seconds to re-enable the touchscreen.
  - To lock the currently adjusted frequency, press and hold the Frequency knob for a few seconds until the receiver beeps; press the Frequency knob again for a few seconds to unlock the frequency.

Set the displayed clock:

- Press and hold the HARD button in the screen until the receiver beeps to display the Time Setting screen .
- Turn the Volume knob to change the value .
- Short press the Volume knob to advance to the next element.
- When date and time entry is complete, press and hold the Volume knob until it beeps to confirm the change.

Indicators and menus

Introduction to Screen Indicators
There is a line of indicators at the top of the screen, if they are gray, they are disabled as shown below:
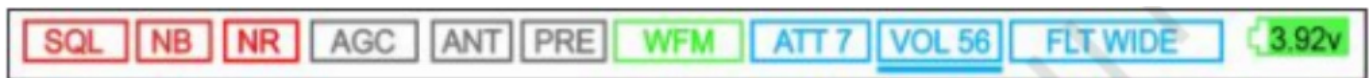
- The SQL green light indicates that squekh has been triggered, and the red light indicates that squelch is enabled but not triggered .
- NB indicates that the noise canceler is enabled .
- NR indicates that noise reduction is on .
- AGC-S displays the current automatic gain control status .
- ANT green light indicates that the Hi-Z antenna is enabled.
- PRE indicates that the preamplifier is on .
- NFM displays the current modulation type, such as AM, WFM, NFM, LSB, orUSB .
- ATT displays the current attenuator setting, shown in decibels (dB) .
- VOL Displays the current volume level.
- FLT NORMAL shows the width of the audio filter applied to the decoded signal.
- 3.92 Displays the current battery voltage and status.

Menu Settings

Introduction to the Main Screen Menu
The bottom of the home screen has a row of menu buttons as shown below:

- HARD sets the radio signal processing function .
- AUDIO sets the audio processing function .
- VISUAL sets the spectrum display and waterfall display, as well as other visual features .
- NR toggles the noise reduction feature on and off .
- MODE switches between different modulation types .
- BAND saves and restores saved frequencies and other settings.
- In the following sections, we describe each menu in detail.

Radio menu (HARD)
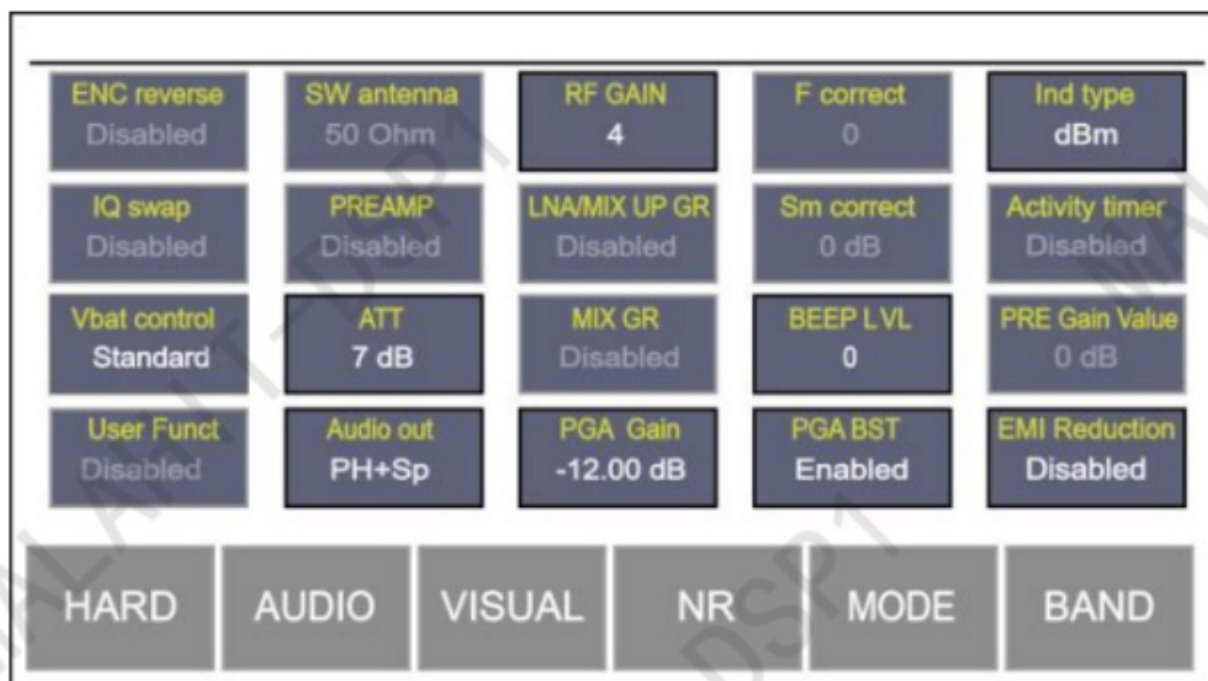
This HARO menu allows you to configure various hardware features such as radio frequency gain, preamplifiers, attenuator5i, and more. Touch a menu item to select n:. If an item has more than two different values, rotate the FREQUENCY knob to toggle between these values. To exit the menu, touch the HARD button again. The menu includes the following items:
Encoder reverse (ENC reverse)
This function allows to change the direction of rotation of one or both encoders.

IQ swap
Shutdown control (Vbat control)

- **Standard:** (Standard mode) When the internal battery voltage falls below 3.3V, the receiver will automatically shut down.

    low: (low voltage operation) The receiver will operate until the internal battery is completely drained.

- **Short wave antenna (SW antenna)**

    Typically the antenna input has an impedance of 50 ohms, which is compatible with most conventional

    shortwave antennas. This option will enable the High Impedance (Hi-Z) input mode for better shortwave

reception when using a tie rod antenna or long wire. When this feature is on, the ANT indicator at the top of the screen will turn green. H i-Z mode is automatically turned off at high frequencies, as it does not make sense to use it in this situation.

- **Pre-Rea mp Low Noise Amplifier (PREAMP)**

  This item switches the built-in preamplifier for the input signal. Use the preamplifier to receive long-distance, weak signals, but note that it also amplifies noise. When this function is on, the PRE indicator at the top of the screen turns green.

- **Attenuator (ATT)**

  HF Input Attenuator; the value is displayed in decibels. This is the same value displayed in the upper right corner of the screen. It can be adjusted with the Volume knob (described earlier) or with the Frequency knob after tapping the screen. Use the attenuation if you have a powerful radio overload receiver nearby.

- **Audio out**

  This function controls whether the audio signal is output directly to the built-in speaker. the headphone port, or both.

- **RF Gain (RF GAIN)**

  This rs the signal gain at the broadband quadrature mixer of the MSI001 chip. Increasing this value amplifies the input signal. If you experience too much noise or signal distortion, decrease this value.

- **Preamp gain attenuation (LNA/MIX UP GR)**

  This is an internal MSI001 parameter that can be used to attenuate strong signals. Its behavior depends on the frequency to which it is adjusted: at frequencies above 30 MHz. the MSI001 chip uses an internal amplifier connected to a mixer, which reduces the amplifier gain. At lower frequencies, the MSI001 chip uses two mixers and this will reduce the gain of the first mixer input.

- **Mixer Gain Attenuation (MIX GR)**

  This is an internal MSI001 parameter that can be used to attenuate strong signals. Its behavior depends on the frequency to which it is adjusted: at frequencies above 30 MHz. the MSI001 chip uses a built-in amplifier connected to one mixer, which reaches the gain of the mixer input. At lower frequencies, the MSI001 chip uses two mixers and this will reduce the gain of the second mixer input.

- **PGA Gain (PGA Gain)**

  Touch the button on the screen and the Frequency knob to adjust the gain value.

- **Frequency offset correction (F correct)**

  This value corrects the frequency displayed at the top of the screen if it differs from the actual frequency. Simply tune to a known frequency (the higher the better) and then adjust the value F correct until the displayed frequency becomes correct.

- **Level meter calibration (Sm correct)**

  This value corrects the signal strength meter displayed at the top of the screen if it differs from the actual strength. Simply tune to a signal of known strength and adjust the value Sm correct until the displayed signal strength becomes correct.

- **Cue Volume (BEEP LVL)**

  This controls the system beep volume. This is the beeping sound you hear when the receiver is turned off. If these beeps are too loud for you, set them lower.

- **PGA BST**

  If you are listening to a very strong signal that overloads the receiver, enable this feature.

- **Level meter display type (Ind type)**

  This toggles between the signal strength meter displayed at the top of the screen and decibels (dBm).

- **Timed shutdown (Activity timer)**

  If you do not touch the receiver for a set period of time (in minutes), it will turn off automatically.

- **Pre-Low Noise Amplifier Gain (PRE Gain Value)**

  When pre-amplification is enabled, this value (in dB) is subtracted from the signal strength meter displayed at the top of the screen. This ts to correct the S-meter reading of the pre-amplified signal.

- **EMI Suppressor (EMI Reduction)**

  Enabling this will reduce the display update frequency to minimize interference with the received signal. Enable this if you see a lot of pseudo-signal ·spikes· in the panorama. When this is enabled, the touch screen will be less responsive. Instead of pressing too hard on the screen, just hold your finger in the same position for a while.

Audio Menu (AUDIO)
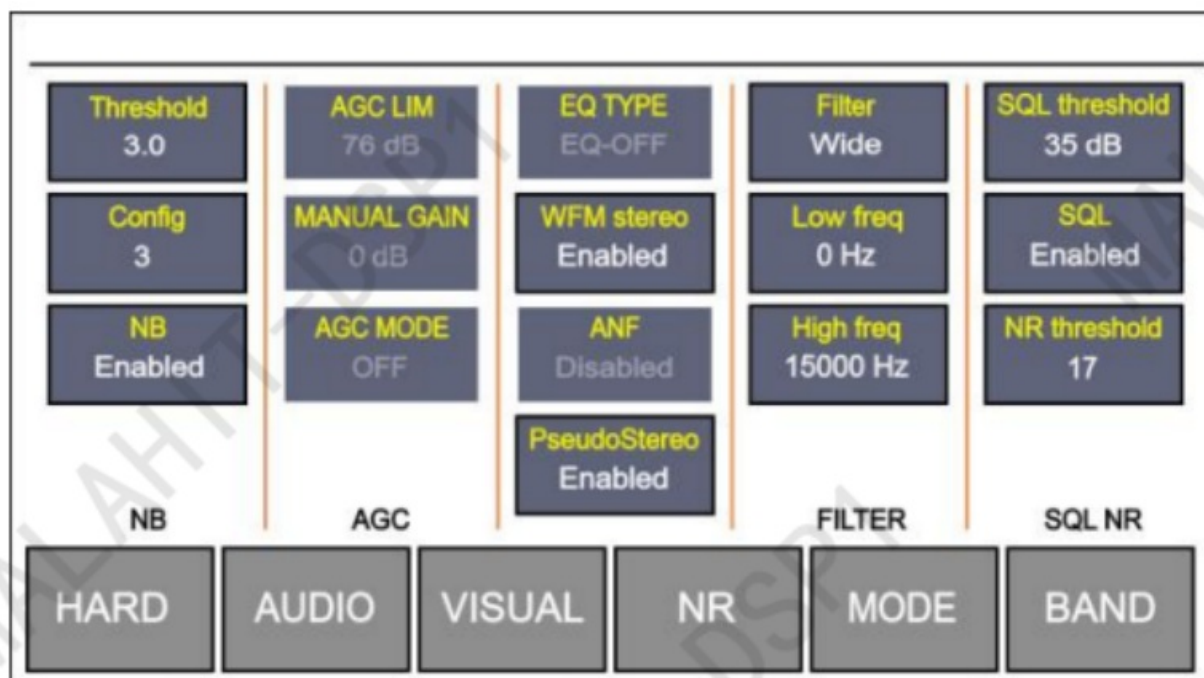
The AUDIO menu allows you to configure various sound characteristics such as filtering, gain, noise reduction, noise cancellation, and squeaky. Touch a menu item to select it. If an item has more than two different values. rotate the Frequency knob to toggle between these values. To exrt the AUDIO menu, touch the button again.
The AUDIO menu contains the following sections:

- **Noise Blanking (NB)**

  The Noise Blanking feature tS used to cancel incoming audio noise. This feature can be enabled or disabled by clicking the NB button.The Threshold value sets the trigger level and it is not recommended to set it below 3.The Config option toggles between several different noise cancellation configurations. Both parameters depend on the type of noise you are attempting to cancel and therefore need to be adjusted audibly.

- **Automatic Gain Control (AGC)**

  The Auto Gain Control feature is used to automatically adjust the audio amplification gain and can be selected among three different AGC modes via the AGC MODE option.The AGC GAIN value controls the amount of amplification applied.The AGC UM value sets the cutoff limit for the Auto Gain Control.

- **Filter**

  The Filter option provides three different audio filter widths: normal, wide, and narrow. These are the same values displayed in the upper right corner of the screen. It can be adjusted with the Volume knob (described

earlier) or with the Frequency knob after tapping the screen. Additionally, the LOW freq and High freq values set hard thresholds for which sound frequencies can pass.

- **Static Noise (SQL)**

  The squelch function, when enabled by the SQL button, will completely cut off the sound it the sound level falls below a threshold value specified by the SQL threshold value. The red SQL light at the top of the screen indicates that squelch is enabled but "off". Once the sound level exceeds the threshold, squelch is ·on· and the SQL light turns green.

- **Noise Reduction (NR)**

  NR threshold specifies the threshold at which noise reduction is applied.

- **Automatic Trap Filter (ANF)**

  The Auto Trap Filter allows the carrier tone to be suppressed when using LSB or USS modulation. For other modulation type this ANF is disabled. To toggle the filter, click the ANF button.

- **Broadcast FM settings**

  The remaining two items relate to FM radio reception. the EQ TYPE option selects the type of equalizer to be applied to FM broadcasts. the WFM stereo option S'Witches the FM stereo sound. Note that you need to enable FM stereo if you want to see text RDS messages transmitted by FM radio stations or automatically scan for stations in the FM band.

- **Stereo effect simulation**

  The PseudoStereo button enables stereo emulation from mono sound. For obvious reasons, it is only useful when listening to music through
  headphones. PseudoStereo mode is disabled when listening to radio stations using WFM modulation.

Visual Menu (VISUAL)
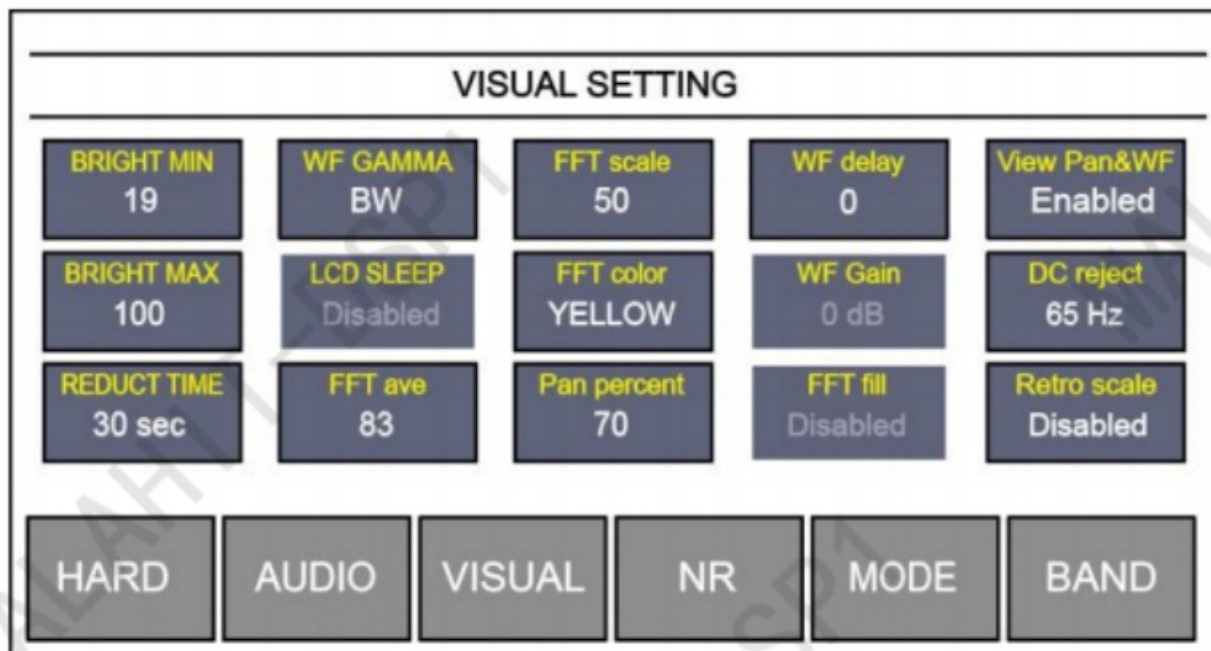
The VISUAL menu enables you to configure the panorama and waterfall displays, change their sensitivity, color scheme and other settings. Touch a menu item to select it. If an item has more than two different values, rotate the Frequency knob to change between those values. To exit the menu, touch the VISAUAL button again.
The VISUAL menu contains the following items:

screen setup

- The BRIGHT MAX value controls the regular screen brightness .
- REDUCT TIME The screen is not operated for the set time (In seconds), it will reduce the brightness to the BRIGHT MIN value .
- BRIGHT MIN The screen is not operated for the set time and the brightness is reduced to that brightness value .
- LCD SLEEP If this option is enabled, the screen will turn off after the receiver has been placed for a selected number of seconds. However, the receiver will continue to operate and the screen will come on again whenever you touch the screen or any knob.

Waterfall Settings

- The WF GAMMA option allows you to choose between several different color schemes for the waterfall diagram .
- The WF Gain value makes the waterfall plot more sensitive to weaker signals, but at the cost of showing more noise .
- The WF delay value controls the speed of the waterfall graph.

]Spectrum Settings

- The FFT color option allows selection of the spectrum color .
- FFT ave adjusts the average number of samples of the spectrum, the larger the value, the slower the spectrum changes .
- FFT scale determines the spectrum amplitude range, the larger the value, the shorter the spectrum display, the larger the signal amplitude can be displayed on the screen .
- FFT fill spectrogram fill display switch .
- FFT level adjusts the horizontal position of the spectrum display .
- The FTT GRID option turns on or off the spectrum area grid line display .
- The Pan percent value controls how much of the spectrum plot and waterfall plot are in the screen in relation to each other.

Disable waterfall charts and spectra
To minimize screen distractions, you may wish to disable the waterfall graph and spectrum displays by changing the ViewPan&WF options. When both the waterfall graph and spectrum are disablec, the screen only updates when you change the frequency or other settings.

DC voltage suppression
For proper operation, the receiver suppresses the direct current (DC) signal component that occurs at the O Hz offset within the panorama. Although the DC component does not affect signal reception, it may appear as a spike in the center of the panorama. The DC reject value controls the strength of the rejection. Setting it too high may create a •gap· in the center of the panorama.

FM Frequency Scale
The receiver includes a separate ·vintage scale view of the FM radio band, similar to the front panel of older shortwave receivers.
While the Retro Scale feature will be discussed later in this document, the FM band layout changes from one count to another.Retro scale allows selection between European and Japanese FM band layouts.

Mode menu (MODE)
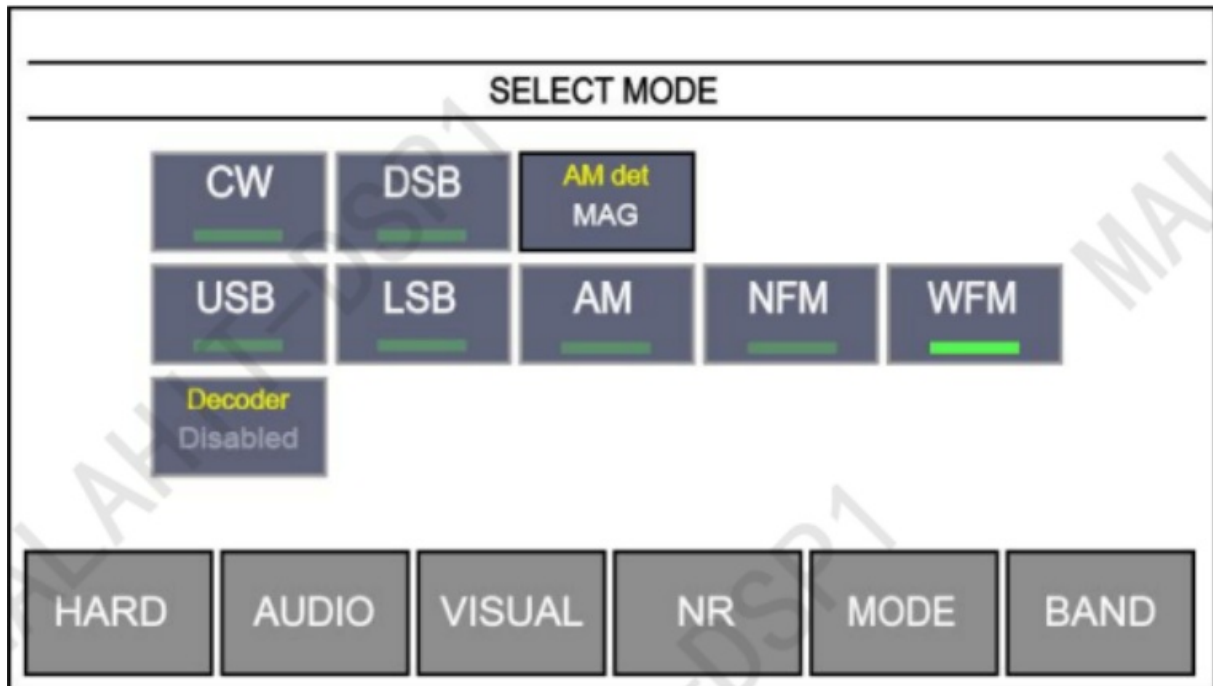
The MOOE menu allows you to change the current modulation mode (shown at the top of the screen) and also enables the CW decoder function. Touch a menu item to select it. If an item has more than two different values, rotate the Frequency knob to change between these values. To exit the menu, touch the button again.
The MODE menu contains the following items:

- **Wideband frequency modulation (WFM)**

  Broadband frequency modulation used by commercial radio statK>ns broadcasting in the FM band. When using WFM modulation. the WFM BW option selects between normal and narrow modulation widths. If you are experiencing interference from neighboring FM broadcasters, use narrow WFM modulation.

- **Narrowband frequency modulation (NFM)**

  Narrowband frequency modulation typically used by police and first responder radios. Amateur radio operators also use this mode when using the VHF and UHF bands.

- **Amplitude Modulation (AM)**

  Amplitude modulation is used by commercial stations broadcasting in the LW, MW, and SW bands, as well as by sailors, pilots, and air traffic control. When AM modulation is used, the option selects the AM demodulator type. Classical Amplitu de Detector (MAG)

- **Synchronized Amplitude Detector (SAM)**

  Synchronized Amplitude Detector for Upper Sideband (SAM U) Synchronized Amplitude Detector (SAM L) for Lower Sideband

  While MAG is the safe default choice, you may want to change to a different de modulator jf the AM signal is too weak or interfered with by a nearby signal.

- **Lower Sideband Amplitude Modulation (LSB)**

  Lower sideband amplitude modulation commonly used by amateur radio operators operating in the 160M, 80M and 40M bands.

- **Upper sideband amplitude modulation (USB)**

  Upper sideband amplitude modulation commonly used by amateur radio operators operating in the 20M and higher bands.

- **Dual Sideband Amplitude Modulation (DSB)**

This option, when used in conjunction with LSB or USB, automatically selects sidebands with higher signal levels.

- **Morse code (CW)**

  This option, when used in conjunction wrth LSB or USB, narrows the width of the audio filter to 1kHz, which is useful for monitoring and decoding Morse Code (CW) transmissions. The LSB/USB indicators at the top of the screen will change to CWL /CWU respectively.This option is not compatible with the Noise Redoction (NR) function!

- **CW Decoder**

  When CW Decoder is enabled, the CW Decoder function will attempt to decode Morse Code (CW) transmissions and display them below the spectrum display. Adjust the Min SNR value to approximately 29 for optimal decoding performance. To further improve ON decoding, you may need to enable the CW option and disable Noise Reduction (NR).

Channel Storage Menu (BAND)
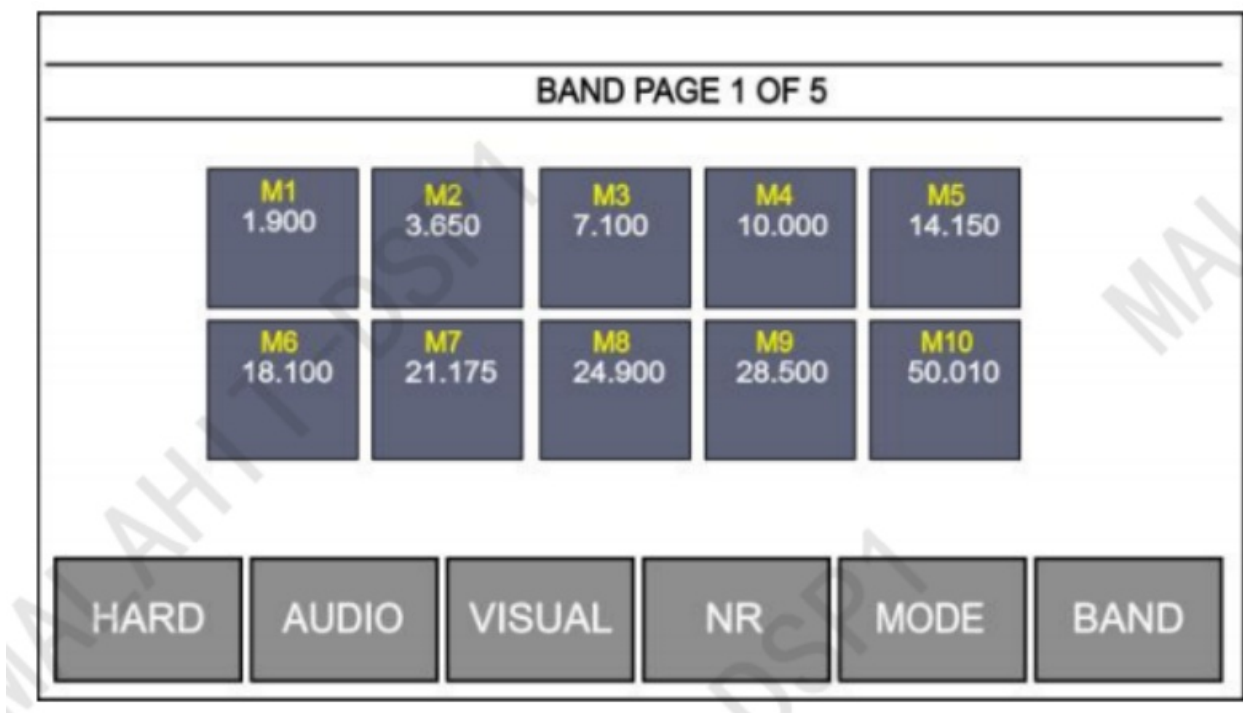
The BAND menu is used to save and read the radio's settings. Click on the BAND icon to open the menu and click on the BAND icon again or clte:k on the EXIT icon to exit the menu. The tabs are laid out on a page-by-page basis and are turned by turning the Frequency knob.
Press and hold the selected memory point for a few seconds until you hear a beep to store the current frequency and setup parameters to the selected memory point.

FM Retro Scale (FM Retro Scale)
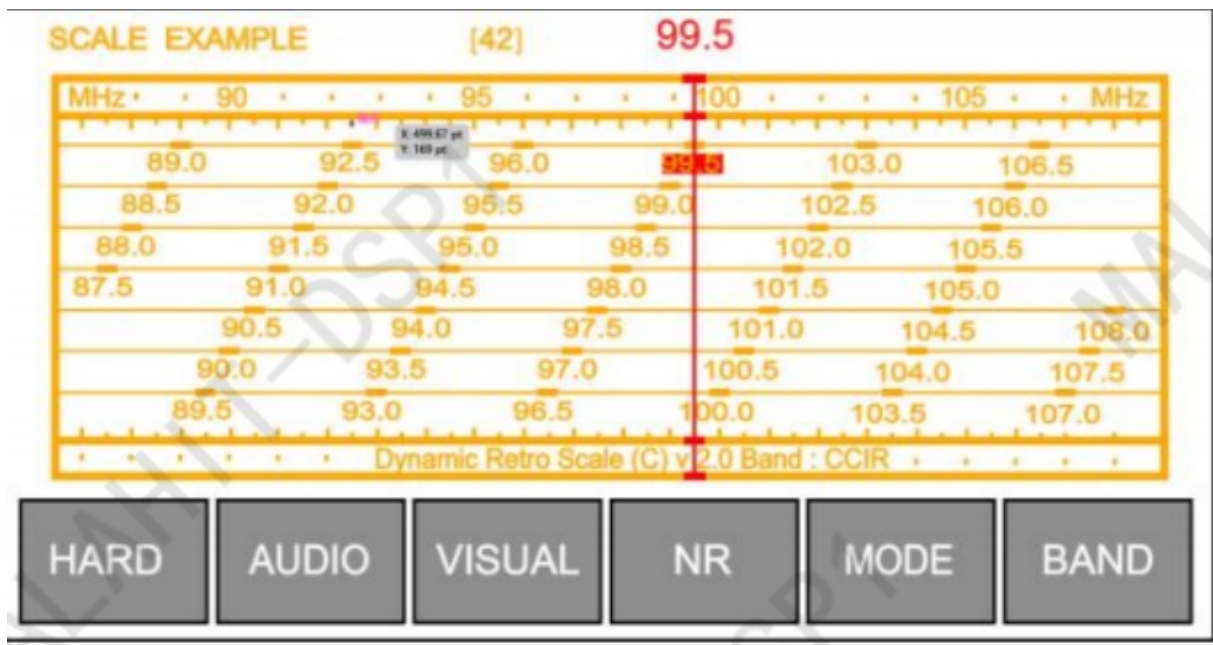
Introduction to Vintage Scale Watches
When using WFM modulation, the receiver provides a "vintage scale" view, similar to the front panel of older wave-testing receivers.

Steps to access the vintage scale view

1. Tune the radio to the FM broadcast band (75-109MHz). The specific FM broadcast band is determined by the region (Europe or Japan) set by the Retro scale option in the VISUAL menu.
2. Select the WFM modulation type in the MODE menu.
3. Click twice in the waterfall chart position to switch to the FM frequency scale table, the first click will enter the MPX interface, click again on the bottom half of the center screen.

    #### Upon entering the vintage scale view
    - Use the Frequency knob to switch between stations .
    - Click the lower half of the scale to return to the regular panorama view.
    - Click on the upper part of the scale to access the Vintage Scale menu.

The Retro Scale menu provides options for adding, deleting, and editing stations. It contains the following buttons:

- **Add/Edit Station (ADD/EDIT STATION)**
  Use the Frequency knob to adjust to the desired frequency, click ADD/EDIT STATION on the screen to enter the setup interface, you can also enter the setup interface first and then call out the station you want to save, then press "ADD AND CONTINUE" to edit the next station, or. ADD AND EXIT' to return to the menu. The other two operations are "DELET E STATION" to completely delete the current station entry, and the "EXIT" button to discard the changes and return to the menu.
- **Rename Scale (RENAME SCALE)**
  Rename the current scale by rotating the Frequency knob to select a letter. Once you have selected a letter, press the Frequency knob to confirm and advance to the next letter. You can reset the name entry by clicking the 'CLEAR NAME' button. When finished, press the SAVE AND EXIT button to confirm, or press the CANCEL AND EXIT button to discard the changes.
- **Clear Scale (CLEAR SCALE)**

This option completely clears the current user-defined scale, deleting all stations and customized scale names (if any). Press the CLEAR button to confirm, or press the CANCEL button to cancel the operation.

- **Switch User Scale (SWITCH USER SCALE)**

  The receiver provides two separately defined user scales. This option toggles between these two scales.

- **LOAD PRESET**

  The receiver has built-in preset scales for many cities. This option allows you to select the scale for your city using the Frequency knob. Note that your current scale will be replaced with the preset scale.

- **AUTO SEARCHING**

  This auto-search feature causes the receiver to scan the FM band for stations and automatically fills the current scale. See details below.

- **EXIT**

  Exit the menu to return to the Retro Scale view.

- **CHANGE COLOR**

  Select a vintage scale color by rotating the Frequency knob or clicking on the appropriate color example. When finished, press the SAVE COLOR & EXIT button to confirm your selection, or press the CANGL AND EXIT button to discard the changes.

Automatic search

The Retro scale allows you to scan for radio waves and fill in the scale with found FM stations. The range of FM broadcasts searched depends on the region (Europe or Japan) set in the Retro scale option in the VISUAL menu. To use the automatic search function, follow the steps below:

1. Go to the HARD menu and make sure the headphone output is enabled in the audio output options. If the headphone output is disabled, the auto-search function will not be available.

2. Go to the AUDIO menu and make sure the WFM stereo option is enabled. If WFM stereo is disabled, the auto search function will not be available.

3. Click on the upper part of the scale to enter the vintage scale menu and click on the "AUTO SEARCHING" button.

The Auto Search screen displays a progress bar, the number of stations found, and a frequency guide indicator. Auto search can be canceled at any time by clicking the "CANCEL" button.

When the automatic search is complete, the screen displays the option to save the results to the current scale: the "SAVE SCALE & EXIT" button, or to discard the results the "CANCEL AND EXIT" button. "button to discard the results. Please note that if you choose to replace the current scale with an automatic search result, the previous scale content will be lost.

Connecting the Receiver to a Computer

Connecting the receiver to a computer

The following description assumes that you are connecting the receiver to a computer running Microsoft Windows 10 or a similar operating system.Windows 10 should have all of the drivers needed to interface with the receiver, so no third-party drivers are required.

You will need a micro USS cable (included with most cell phones) to connect the receiver to your computer. Make sure your micro USB cable supports data connections. After connecting the receiver to any available USB por t on your computer and turning on the receiver, you can see the following three new USB devices in the Windows Device Manager panel:

- **Malahit RX**

This is an audio input device that feeds the sound from a malachite radio into your computer, and you can use it as you would a regular microphone device

- **Malahit IQ**

  This device is also used as a kind of 'audio input', but it inputs the entire 192kHz spectrum data. You can use this device with a variety of SOR software (such as HOSOR, SOR++, or SOR#) to receive and process the same spectral data as a Malachite radio.

- **Malahit CAT**

  This is the USS serial port mode that allows you to change the frequency, modulation, volume and other parameters of the Malachite radio using your computer. The command set used by the Malachite radio is compatible with that of the Kenwood TS-480.

  When you see "Malahit USB" in the Windows Devic,e Manager panel remember to go to the Windows Sound Control Panel and make sure the "Malahit RX" and "Malahit IQ" audio inputs are enabled.

- **Verify connection to HDSDR**

  Verify the functionality of the radio with the HDSDR application on a Windows system by following these steps:

  1. Install and run the HDSDR software.
  2. Select "Options I Select Input I Sound Card as the receiver acts as a sound card device.
  3. Click on "Sound Card" and select "Malahit IQ" in the "RX Input (from Radio)" box.
  4. Click "OK" to confirm your selection.

After completing the above steps, the H DSDR should display the same spectrogram and waterfall display as your radio. At this point you can use the radio's knobs to adjust the frequency.

Controlling the receiver from a computer
To adjust the receiver frequency from a computer, you will need to interface the OmniRig software with a "Malahit CAT" USB device.

1. Go to Windows Device Manager and locate the COM port device associated with the "Malahit CAT". This can be determined by disconnecting and reconnecting the Malahit receiver. One of the COM port entries located under the "Ports COM and LPT" branch should disappear and then reappear. That will be your COM port device. If you reconnect the receiver to a different USB slot the port will change.

2. Install and run OmniRig. In the OmniRig window, set '"RIG 1″ according to the following configuration, and click "OK" to confirm the changes.

   - Rig Type = TS-480
   - Port = <your COM port>
   - Baud Rate = 19200
   - Oata Bits = 8
   - Parity = None
   - Stop Bits = 1
   - RTS = High
   - DTR = High
   - Poll = S00
   - Timeout = 4000

3. In HDSDR. select "Options I CAT to Radio I Sync RIG1 ·, and enable ·use v1", "Sync to Rig", "Sync from Rig", "Sync LO Frequency" and "Sync Modulation" in the same menu.·, "Sync from Rig", "Sync LO Frequency" and sync Modulation Sync Modulation·.

You should now be able to control the Malahit receiver through the frequency and other settings in the HDSDR software.

Dealing with internal disturbances

- **Dealing with various internal disturbances**

  A Malahit receiver is essentially a small computer containing several digital components such as a CPU, display and touch screen. Since all of these components operate using digital signals, they all generate their own electromagnetic noise that affects reception quality. In this section, we will describe common sources of interference within the receiver and how to deal with them.

- **Noise when touching the screen**

  Touchscreen noise occurs mainly in the shortwave band and manifests itself as a constant buzzing sound that gets louder when you touch the screen. The best way to solve this problem is to move the antenna away from the receiver by at least a few meters. If this is not possible (e.g. by using a tie rod antenna), you can temporarily disable the touch screen by pressing and holding the Volume knob for a few seconds. After disabling the touchscreen, you can still use the knob to adjust the receiver. Press and hold the Volume knob again to re-enable the touchscreen.

- **display noise**

  Display noise typically occurs in the VHF and adjacent frequency bands. It manifests itself in the form of visible "bumps" or "spikes" on the panoramic display, often blocking useful signals. The best way to solve this problem is to move the antenna at least a few meters away from the receiver. If this is not possible, you can reduce the display noise by going to the RADIO menu and enabling the EMI Reduction option. This will slow down display updates and reduce interference but will make the touchscreen more unresponsive. Finally, you can temporarily disable the display by clicking the Power button. After disabling the display, you can still use the knobs to adjust the receiver. Tap the Power button again to re-enable the display.

Selecting the right antenna

Antenna Introduction and Selection

Your antenna selection will always depend on the frequencies you wish to receive and the level of radio interference in your location. In this section, we will cover some of the options available.

rod antenna

The receiver comes with a tie rod antenna that can be used on a variety of different frequencies. provided there are no strong sources of electromagnetic interference near you. Possible sources of interference include power supplies, cell phone chargers. LED lights, refrigerators, air conditioners. water pumps and other equipment.

In the Long Wi!Ve (LW), Medium Wave (MW) and Short Wave (SW) bands (<30MHz), the original tie rod antenna is not the best choice. However; it can still be used in these bands. To improve reception on these bands, go to the RADIO menu and enable the SW antenna option to enter high impedance (Hi-Z) antenna mode. The ANT indicator at the top of the screen will turn green when this feature is on. At higher frequencies, Hi-Z mode is automatically disabled as it does not produce any benefit. You can also enable the PREAMP option to increase signal amplification, but it will increase noise.

Other tie-rod antennas can be used with receivers. They work in much the same way, with longer-length antennas being more sensitive at lower frequencies. More expensive tie-rod antennas are made of stronger materials and offer better tuning. Some popular choices are the Comet SMA-WI 00RX and the Diamond SRH789. some antennas come with BNC connectors and require a BNC to SMA adapter to connect to the receiver. Whichever tie rod antenna you choose, keep in mind that a heavier antenna will put more stress on the SMA connector and may eventually damage it.

- **Long wire antennas (LW, MW, SW)**

  The optimal length of a tie rod antenna should be close to 1/2 of the wavelength you wish to receive. e.g., if you plan to listen to the shortwave band on 25 meters, the optimal antenna length would be 25 / 2 – = 12.5 meters. This makes it quite difficult to make a good shortwave tie rod antenna. However; you can still connect a very long wire to the antenna connector and project it outside or around the room as needed. Shortwave radio manufacturers offer some of these antennas, such as the Sangean ANT-60, Tecsun AN–05, or XHDATA AN-80, where the wire conveniently retracts into the reel. As with tie rod antennas, long wire antennas are susceptible to electromagnetic interference.

- **Rubber whip antenna (VHF, UHF)**

  At shorter wavelengths (above 80 MHz), short rubber whip antennas for walkie-talkies, emergency communication radios and scanners can be used.

  These antennas are small, portable, and provide good reception in the FM, VHF, and UHF bands Some examples include the Nagoya NA-701, Nagoya NA-771, Comet SMA-501, and Comet SMA-503. Note that these antennas are tuned specifically for the VHF and UHF bands and are not useful in the LW, MW, and SW bands.

loop antenna

- As mentioned earlier, electromagnetic interference is usually a huge problem when listening to radio indoors or in urban environments. Magnetic loop antennas attempt to solve this interference by receiving the magnetic component of the sign an l instead of the noisier electrical component.

- A typical loop antenna consists of one or more relatively small coils connected to a receiver by means of a small transformer ("balanced-unbalanced transformer" or "unbalanced-unbalanced transformer").

- The total area of the coil determines the amount of magnetic flux it receives, so larger coils are more sensitive. The loop antenna is directional, and maximum gain is achieved when one side of the coil is pointing toward the source.

- While loop antennas are more resistant to EMI, they are also less sensitive than conventional antennas. For this reason, most commercial loop antennas contain low-noise amplifiers that need to be powered. Some commercial loop antennas are Youloop, MLA-30+, and GA-450.

Documents / Resources

[GOOZEEZOO MALAHIT-DSP1 Malachite Receiver](#) [pdf] User Manual
MALAHIT-DSP1 Malachite Receiver, MALAHIT-DSP1, Malachite Receiver, Receiver

References

- **User Manual**