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› V2.4 Version Malachite DSP2 SDR Radio Receiver User Manual

SDRGEEK SDR DSP2

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USER MANUAL

This manual provides detailed instructions for the setup, operation, and maintenance of your SDRGEEK V2.4 Version Malachite DSP2 SDR Radio Receiver. Please read thoroughly to ensure optimal performance and longevity of your device.

Product Overview

The SDRGEEK V2.4 Version Malachite DSP2 SDR Radio Receiver is a powerful and portable software-defined radio designed for a wide range of listening applications. Featuring a 3.5-inch touch screen and a robust aluminum alloy casing, it offers exceptional sensitivity and advanced signal processing capabilities.



Figure 1: Malachite DSP2 SDR Radio Receiver and included accessories.

Key Features:

- **Latest V2.4 Upgrade:** Adopts SDR architecture with a frequency range of 10kHz-380MHz and 404MHz-2GHz. Includes adjustable filter width, built-in preamplifier, and unique NR noise reduction.
- **Multiple Modulation Types:** Supports AM, SSB (LSB USB), DSB, CW, NFM, WFM, and DECODER modulation modes (FM supports RDS analog stereo).
- **High Sensitivity:** Sensitivity of 0.3uV up to 1GHz, dynamic bandwidth of 82dB, and new Ft8 decoding function for weak signals.
- **Noise Reduction & Anti-Interference:** Features adaptive noise reduction (NR), threshold noise reduction, noise canceller (NB), automatic gain control (AGC), and automatic notch filter.
- **Excellent Design:** Durable aluminum alloy shell, compact structure, 3.5-inch LCD touch screen with adjustable backlight.

- **Long-lasting Battery:** Built-in 5000mAh battery for extended listening time. Supports external TYPE-C charging and USB connectivity for CAT, IQ, and audio transmission.

What's in the Box

Upon unboxing, please verify that all the following items are included:

- Main Unit (Malachite DSP2 SDR Radio Receiver)
- Antenna
- 2-in-1 Stylus
- Bracket
- TYPE-C Data Cable
- EVA Storage Bag
- Lanyard
- 3M Transparent Foot Mat
- Manual

Setup Guide

Follow these steps to set up your Malachite DSP2 SDR Radio Receiver for first use.

1. Charging the Device

Before initial use, fully charge the built-in 5000mAh battery. Connect the supplied TYPE-C data cable to the device's TYPE-C port and the other end to a compatible USB power adapter (not included) or a computer USB port. The charge indicator will show charging status.

2. Attaching the Antenna

Locate the SMA connectors on the top of the device. Carefully screw the provided antenna into the appropriate SMA connector. The device supports a 50 ohm female SMA connector and offers high impedance mode for flexible signal reception.



Figure 2: Connecting the antenna to the SMA connector.

3. Powering On/Off

To power on the device, locate the main switch on the side and slide it to the 'ON' position. To power off, slide it to the 'OFF' position. The device will boot up and display the main interface on the 3.5-inch touch screen.

WIDELY USE



Figure 3: Key components and controls of the Malachite DSP2 SDR Radio Receiver.

Operating Instructions

This section details the various functions and operations of your SDR radio receiver.

1. Navigating the Touch Screen Interface

The device features a 3.5-inch LCD touch screen for intuitive control. Use your finger or the provided stylus to interact with the menus and settings. The screen's backlight brightness can be adjusted for comfortable viewing in various lighting conditions.



Radio Hardware



Audio Function



Visual Function



Mode Function



Band Function



Channel Monitor

Figure 4: Overview of the main display screen elements.

2. Frequency Tuning and Modulation

Use the frequency knob to adjust the receiving frequency. The touch screen also allows for direct frequency input or selection from bands. The device supports various modulation types including AM, SSB (LSB USB), DSB, CW, NFM, WFM, and DECODER. Select the desired modulation mode from the on-screen menu.

10kHz-380MHz, 404MHz-2GHz

2.4 Version Update

Modulation Type:
AM, SSB, DSB, CW, NFM, WFM

Panorama Width:
192kHz, 96kHz, 48kHz

Sensitivity:
0.3uV up to 1GHz

Dynamic Bandwidth:
82dB



Figure 5: Frequency range and supported modulation types.

3. Noise Reduction and Audio Settings

The receiver incorporates advanced noise reduction features to enhance audio clarity. Access the 'NR' (Noise Reduction) menu on the touch screen to enable or adjust settings such as Adaptive Noise Reduction (NR), Threshold Noise Reduction, Noise Canceller (NB), Automatic Gain Control (AGC), and Automatic Notch Filter (ANF). You can also customize audio high and low bass via the built-in equalizer.

Noise Reduction and Anti-Interference



- ☒ Variable filter
- ☒ NR Adaptive Noise Reduction
- ☒ Threshold Noise Reduction
- ☒ NB Noise Canceller
- ☒ AGC Automatic Gain Control
- ☒ ANF Auto Trap
- ☒ SDR Analogue Stereo
- ☒ Upgrade Firmware Support

Figure 6: Noise reduction and anti-interference optimization features.

4. Memory Points and Band Selection

The frequency knob can be used to switch between 50 monitoring memory points. Utilize the 'BAND' menu to select predefined frequency bands or create custom ones for quick access to your favorite stations.



Figure 7: Detailed views of various function screens for configuration.

5. USB Connectivity

Connect the device to a computer via the TYPE-C USB port to transmit CAT (Computer Aided Transceiver) commands, IQ (In-phase and Quadrature) data, and audio signals. This allows for advanced control and data analysis using compatible software.

5000mAh Battery Standby Up to 10-hour

Connected to computer via USB,
CAT, IQ and audio can be transferred



Figure 8: USB connectivity for data and audio transfer.

6. Firmware Upgrade

The device supports firmware upgrades via the official website. Ensure your device is registered and follow the instructions provided on the official SDRGEEK website for the latest software enhancements and bug fixes.

Maintenance

Proper maintenance ensures the longevity and optimal performance of your SDRGEEK Malachite DSP2 SDR Radio Receiver.

1. Battery Care

- Avoid fully discharging the battery frequently.
- Charge the device regularly, even if not in use, to maintain battery health.
- Store the device in a cool, dry place when not in use for extended periods.

2. Cleaning

- Use a soft, dry cloth to clean the exterior of the device.
- For the touch screen, use a microfiber cloth specifically designed for electronics to avoid scratches.
- Do not use harsh chemicals, solvents, or abrasive cleaners.

3. Storage

When storing the device, especially for long periods, ensure it is powered off and stored in the provided EVA storage bag to protect it from dust and physical damage. Avoid extreme temperatures and high humidity.

Troubleshooting

If you encounter issues with your Malachite DSP2 SDR Radio Receiver, refer to the following common problems and solutions.

1. Device Does Not Power On

- **Check Battery:** Ensure the battery is charged. Connect the device to a power source using the TYPE-C cable and allow it to charge for at least 30 minutes before attempting to power on again.
- **Main Switch:** Verify that the main power switch is in the 'ON' position.

2. No Audio Output

- **Volume Level:** Check the volume knob and on-screen volume settings to ensure the volume is not set to minimum or muted.
- **Headphone Connection:** If using headphones, ensure they are properly plugged into the 3.5mm audio output jack.
- **Signal Strength:** Verify that you are receiving a strong enough signal. Weak signals may result in no audible output.

3. Poor Reception or Static

- **Antenna Connection:** Ensure the antenna is securely connected to the SMA port.
- **Antenna Type:** For optimal reception, ensure you are using an appropriate antenna for the frequency band you are trying to receive.
- **Location:** Move to an open area away from potential sources of interference (e.g., computers, large electronic devices, power lines).
- **Noise Reduction Settings:** Adjust the NR, NB, AGC, and ANF settings in the 'NR' menu to reduce background noise and interference.

4. Frequency Adjustment Step Resets

Some users may experience the frequency adjustment step resetting to 100 Hz when switching bands or powering off the device. This behavior is part of the device's design. To restore your desired step, use the frequency knob and press it periodically to expand the jump (e.g., from 1kHz to 1MHz) and then click the knob again to continue shifting frequency.

Specifications

Feature	Specification
Model Number	SDR DSP2
Frequency Range	10kHz-380MHz, 404MHz-2GHz
Modulation Types	AM, SSB (LSB USB), DSB, CW, NFM, WFM, DECODER (RDS analog stereo for FM)
Sensitivity	0.3uV up to 1GHz
Dynamic Bandwidth	82dB
Display	3.5-inch LCD Touch Screen
Battery	5000mAh Lithium Ion (included)
Connectivity	USB (TYPE-C), 3.5mm Jack (Audio Output)
Antenna Connector	50 ohm female SMA
Product Dimensions	1.2 x 3.7 x 5.1 inches (3.05 x 9.4 x 12.95 cm)
Item Weight	1.65 pounds (0.75 kg)
Manufacturer	SDRGEEK
Country of Origin	China

Warranty and Support

For warranty information and technical support regarding your SDRGEEK Malachite DSP2 SDR Radio Receiver, please refer to the documentation provided at the time of purchase or visit the official SDRGEEK website. Our support team is available to assist with any questions or issues you may encounter.

Manufacturer: SDRGEEK

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