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› MALAHIT uSDX Transceiver 5-Band Multimode QRP Kit Instruction Manual

## Malahit A-06

# MALAHIT uSDX Transceiver 5-Band Multimode QRP Kit Instruction Manual

MODEL: A-06

## Introduction

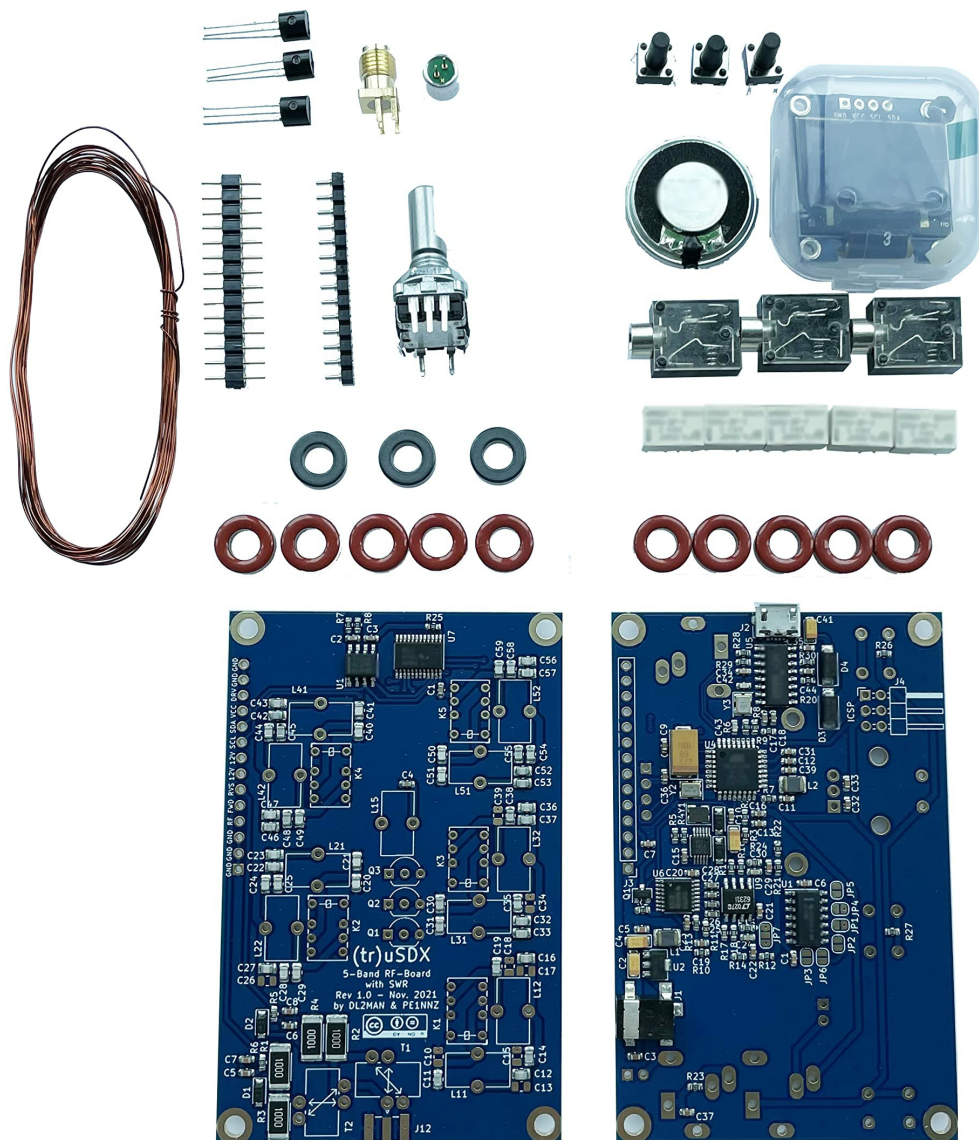
This manual provides comprehensive instructions for the assembly, setup, and operation of your Malahit uSDX 5-Band Multimode QRP Transceiver Kit, Model A-06. The (tr)uSDX is a collaborative design by PE1NNZ and DL2MAN, intended as an easy-to-build kit for amateur radio enthusiasts. It features an OLED display, onboard microphone, small onboard speaker, and an onboard PTT key for improvised operation. Additionally, it includes an onboard SWR bridge and voltage/current measurement hardware to assist with tuning and operation.

## Safety Information

Always exercise caution when working with electronic components and soldering equipment. Ensure proper ventilation and use appropriate personal protective equipment, such as safety glasses. Disconnect power before making any connections or adjustments. Incorrect assembly or handling can damage the device or cause injury.

## Package Contents

Your Malahit uSDX kit includes the following components. Please verify all parts are present before beginning assembly.



**Figure 1:** All components of the Malahit uSDX Transceiver Kit, including two blue PCBs, various electronic components, wires, and connectors.

- Mainboard (Version 1.2)
- RF Board (Version 1.0)
- OLED Display
- Encoder with knob
- Push buttons
- Speaker
- Microphone
- Various connectors (e.g., audio jacks, power jack)
- Header pins (Female 14-pin single straight, Male 14-pin double straight)
- Toroids (red and black)
- Copper wire for winding toroids
- Small plastic enclosure (if included in your specific kit variant)

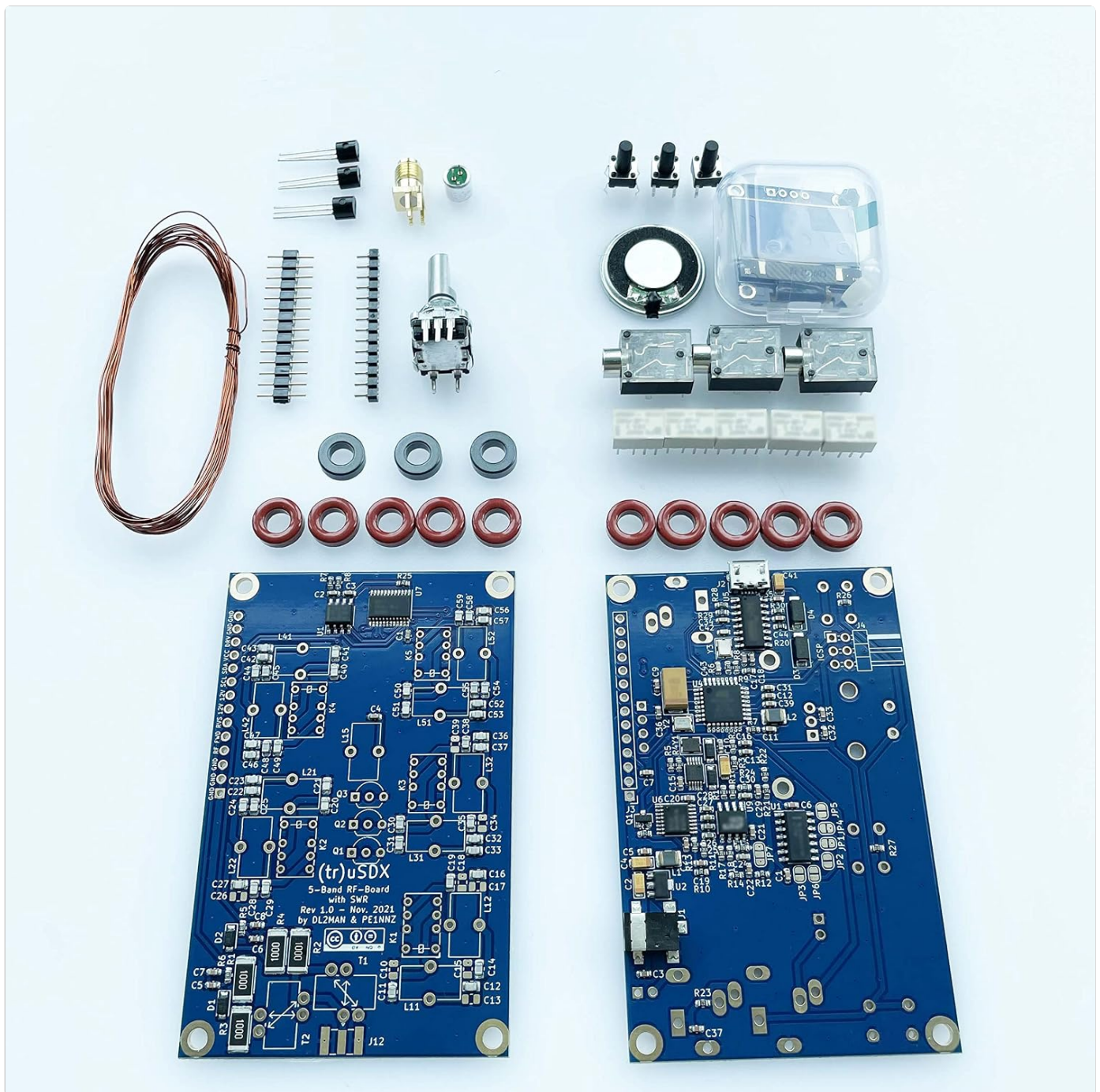
- Serial number (pasted on the electrostatic bag for firmware updates/callsign programming)

## Assembly Instructions

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This kit requires assembly. Careful attention to detail during soldering and component placement is essential for proper functionality.

1. **Prepare Components:** Organize all components and identify them against the provided parts list.
2. **Solder Header Pins:**
  - Solder the **Female 14-pin headers (Single Straight)** onto the RF board.
  - Solder the **Male 14-pin headers (Double Straight)** onto the mainboard.
3. **Winding Toroids:** The kit includes toroids and copper wire. You will need to wind these according to the specific instructions provided by the original creators (DL2MAN and PE1NNZ). Refer to their official documentation or recommended video guides for precise winding techniques. *Note: Some users have reported needing to adjust the number of turns on LX2 (Red) toroids; typically, one loop less may be required.*
4. **Mounting Boards:** Connect the RF board to the mainboard using the soldered header pins. Ensure correct orientation.
5. **Connect Peripherals:** Solder and connect the OLED display, encoder, push buttons, speaker, and microphone to their designated points on the mainboard.
6. **Power Jack and Other Connectors:** Solder the power jack and any other audio or data connectors. Ensure strong, clean solder joints. *Note: Some users have experienced issues with cold solder joints on the 12V jack pads; ensure these are properly reflowed if necessary.*
7. **Final Inspection:** Before applying power, carefully inspect all solder joints for bridges, cold joints, or misplaced components.



**Figure 2:** Detailed view of the RF board (Rev 1.0 Nov. 2021) showing component placement and solder points. Note the labels for T1, T2, and various capacitors and inductors.

For the mainboard, refer to Figure 1 for its layout. Pay close attention to the ATMEGA microcontroller and ensure all its pins have clean, solid solder connections. Some users have reported issues with cold solder joints on the ATMEGA, which can lead to incorrect SWR and power readings.

## Setup

The mainboard comes with the bootloader burned and firmware programmed. The serial number, essential for future updates and callsign programming, is located on the electrostatic bag the kit came in. Do not discard this bag.

1. **Initial Power-Up:** After assembly, connect a 13.8V DC power supply. The device should power on and display information on the OLED screen.
2. **Programming Your Callsign (Optional):** If you wish to program your callsign or update the firmware, follow these steps:

- Download the latest firmware from DL2MAN's official page.
- Enter the serial number (from the electrostatic bag) when prompted during the firmware download process.
- Install the USB Driver for the CH340 chip. If installation issues occur, try another computer.
- Install the AVR-Dude software.
- Restart your computer.
- Connect the mainboard to your computer via a USB cable. Ensure the USB cable supports data transmission. A "ding-dong" sound from your computer indicates successful CH340 driver recognition.
- Open the AVR-Dude software. Configure the software settings as instructed in the official documentation (often with images showing circled positions).
- Proceed with programming the firmware/callsign.

## Operating Instructions

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The (tr)uSDX is designed for 5-band operation (80m, 60m, 40m, 30m, 20m) and supports multimode QRP communications.

- **Power Supply:** The transceiver typically produces 5W output when powered by a 13.8V supply. It can also provide 0.5W output from a 5V USB supply alone.
- **User Interface:**
  - **OLED Display:** Provides operational information such as frequency, mode, SWR, voltage, and current.
  - **Encoder:** Used for frequency tuning and menu navigation.
  - **Onboard Mic & Speaker:** For basic audio input and output. An external speaker is recommended for better audio quality.
  - **Onboard PTT Key:** Can be used for emergency CW keying or Push-To-Talk functionality.
- **SWR Bridge and Measurement:** The integrated SWR bridge and voltage/current measurement hardware assist in antenna tuning and monitoring operational parameters.
- **Reset Function:** To perform a reset:
  1. Hold down the encoder button (do not release).
  2. While holding the encoder, turn on the power.
  3. Once "restart" is displayed on the OLED, release the encoder button. The reset process is complete.
- **USB CAT and Programming Interface:** The (tr)uSDX includes a Micro-USB port for CAT control and programming.

## Maintenance

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To ensure the longevity and optimal performance of your Malahit uSDX transceiver, observe the following maintenance guidelines:

- **Cleaning:** Keep the device clean and free from dust and debris. Use a soft, dry cloth for cleaning. Avoid liquid cleaners.
- **Environmental Conditions:** Operate and store the transceiver in a dry environment, away from extreme temperatures, humidity, and direct sunlight.
- **Firmware Updates:** Periodically check DL2MAN's official page for firmware updates. Keeping your firmware current can improve performance and add new features. Follow the programming instructions carefully.
- **Component Inspection:** Regularly inspect solder joints and connections for any signs of wear or damage, especially if the device is frequently moved or subjected to vibrations.



## Troubleshooting

If you encounter issues with your Malahit uSDX kit, refer to the following common problems and solutions:

- **Device Does Not Power On:**
  - Check the power supply connection and ensure it provides 13.8V DC.
  - Inspect the solder joints on the 12V power jack. Reflow if necessary.
  - Verify the 5V regulator is functioning correctly. A faulty regulator can prevent power-up.
- **Incorrect SWR or Power Readings (e.g., 9.99 SWR, 13W power):**
  - This often indicates issues with the ATMEGA microcontroller's solder joints. Carefully inspect and reflow the solder on the ATMEGA processor pins.
  - Re-check the toroid windings (T1, T2, LX2). Incorrect windings can lead to inaccurate readings.
- **USB Connection Issues (CH340 Driver):**
  - Ensure the CH340 driver is correctly installed. Try reinstalling it or using a different USB port/computer.
  - Use a USB cable that supports data transfer, not just charging.
- **No Audio from Speaker / No Mic Input:**
  - Check the speaker and microphone connections and solder joints.
  - Verify volume settings on the device.
- **General Malfunctions:**
  - Review all solder joints for cold joints or bridges.
  - Ensure all components are correctly oriented and placed.
  - Consult the official documentation and community forums for further assistance.

## Specifications

|                       |                                                  |
|-----------------------|--------------------------------------------------|
| Brand                 | Malahit                                          |
| Model Number          | A-06                                             |
| Bands Supported       | 80m, 60m, 40m, 30m, 20m                          |
| Output Power (13.8V)  | Typically 5W                                     |
| Output Power (5V USB) | 0.5W                                             |
| Impedance             | 50 Ohms                                          |
| Maximum Range         | 1000 Meters (approximate, depends on conditions) |
| Mainboard Version     | 1.2                                              |
| RF Board Version      | 1.0                                              |
| Interface             | Micro-USB (CAT and Programming)                  |

## Warranty and Support

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The Malahit uSDX Transceiver Kit comes with a **1-year warranty**. For technical support, detailed documentation, or community resources, please refer to the official websites of the original creators, DL2MAN and PE1NNZ, or contact your seller. When seeking support, provide your serial number and a clear description of the issue.

