NOVA-RF User Manual
Version 1.0
Last Updated: April 2025
Device Type: Multi-protocol RF/NFC/IR Utility Device
Powered by: ESP32-S3 Dev Kit C-1 + 4.3” Touch LCD
Website: https://hacknback.tech

Table of Contents

1. Introduction
NOVA-RF is a compact, handheld RF experimentation tool designed for researchers, developers, and enthusiasts. It combines multi-frequency RF receivers, NFC, IR, and Bluetooth/Wi-Fi tools into a single, touchscreen interface powered by ESP32-S3.

⚠ This device is intended for educational and testing purposes only. Unauthorized use of RF signals may be illegal in your region.

2. What’s Included
NOVA-RF Main Device (ESP32-S3 + Touchscreen)

PN532 NFC RFID Module (pre-wired)

IR Transmitter Module (pre-wired)

433MHz and 315MHz RF Receiver Modules

LiPo Battery (1000mAh)

USB Type-C Charging Cable

Pre-installed NOVA-RF firmware

MicroSD Card (optional, for advanced functions)

3. Safety Information
Do not short-circuit the battery or expose the device to moisture.

Use only the included charger or a safe 5V USB source.

Avoid direct eye contact with IR transmitters.

Store away from heat sources or prolonged sun exposure.

4. Powering the Device
Charge the device via USB Type-C (5V) using the included TP4056 charging module.

A full charge takes approximately 1.5–2 hours.

Press and hold the power button (if installed) or simply apply power via USB to boot.

5. Touchscreen Navigation
The NOVA-RF uses a full-color 4.3” capacitive touchscreen in portrait mode.

Controls:
Tap icons or menu items to select

Back button (bottom left) returns to the previous screen

Home button (bottom right) returns to main menu

Scroll through menus by swiping vertically

6. Main Menu Overview
When the device boots, you’ll see an animated NOVA-RF splash screen, followed by the main menu with the following sections:

📶 RF Tools

📲 NFC Tools

📡 IR Tools

🔍 Sniffer + Replay

🛠️ System Tools

7. Feature Guide
📲 NFC Tools
Scan NFC: Read supported tags using the PN532 module

Write NFC: Write text/URL/data to blank tags

Emulate Tag: Act as a simple NFC tag (limited compatibility)

History: View recent scans

📡 IR Tools
Transmit IR: Send saved IR codes (TVs, fans, etc.)

Learn IR: Record IR signals using a connected TSOP receiver (future version)

IR Database: Preloaded common remote codes (coming soon)

📶 RF Tools
Scan RF: Use RXB6/12 to monitor 433/315 MHz signals (ASK/OOK)

Record RF: Capture and save common keyfob or doorbell signals

Replay RF: Send recorded RF signals via the onboard RMT/GPIO output

Signal Library: Manage saved RF codes for easy replay

🔍 Signal Sniffer + Replay
Live Sniffer: Shows waveforms or code patterns in real time from GPIO 36

Save Signal: Store captured signal for reuse

Replay Now: Send recorded signal via assigned GPIO pin (default: GPIO 1)

Analyze Signal: Inspect timing, width, and pulse length of captured data

🛠️ System Tools
Wi-Fi Settings: Configure access point and OTA settings

Bluetooth Tools: BLE scanning and simple payload sender (basic)

OTA Update: Update firmware via browser or local network

Device Info: View current firmware version, storage space, battery status

8. Storage and File Access
The device uses onboard flash or a MicroSD (if installed) to store signals and logs

Files can be accessed via USB mass storage mode (coming soon) or via OTA web UI

9. Firmware Updates (OTA)
Connect to the NOVA-RF Wi-Fi hotspot (NOVA-RF_XXXX)

Open browser and visit: http://192.168.4.1/

Select Firmware Update

Upload new .bin file and wait for reboot

10. Troubleshooting

Problem	Solution
Screen not responding	Reboot the device; check touchscreen cable
No RF signals detected	Ensure correct module is plugged in
OTA not working	Reboot and try again; clear browser cache
IR not transmitting	Verify IR transmitter is connected properly
NFC tag not detected	Hold tag closer or reposition over reader

11. Future Expansion
NOVA-RF is modular and open for future upgrades, including:

OLED support

SDR integrations

Custom plugin system for scripts

Hardware GPIO debugger mode

BLE remote control from phone

12. Contact & Support
For updates, help, or reporting bugs:
📧 Email: helpme@hacknback.tech
🌐 Web: https://hacknback.com/product/nova-rf

Disclaimer: NOVA-RF is an experimental device. Use responsibly and within legal boundaries. The developers are not liable for misuse or violations of RF regulations.