



VALKYRIE C2

COMMAND AND CONTROL

○ FPV Drone Command and Control

USER MANUAL



NEXTGENRF.COM

Copyright Notice

© Copyright 2010-2026 NextGen RF Design. All rights reserved.

Trademark Notice

ValkyrieC2™ is a trademark of NextGen RF Design.

All other trademarks, trade names, product names, or logos referenced in this document are the property of their respective owners.

Documentation Disclaimer

The information contained in this document is provided for informational purposes only and is subject to change without notice.

NextGen RF Design assumes no responsibility for technical inaccuracies, typographical errors, or omissions contained herein. Current product specifications, regulatory information, and operational guidance may supersede information contained in this manual.

Firmware & Software License Notice

Embedded software, firmware, and related intellectual property provided with this product are licensed, not sold.

Except as expressly authorized in writing by NextGen RF Design, users may not copy, modify, distribute, sublicense, reverse engineer, or create derivative works from the software or firmware associated with this product.

All rights not expressly granted are reserved by NextGen RF Design.

Cybersecurity and Data Protection Disclaimer

The user is solely responsible for implementing and maintaining appropriate cybersecurity protections, access controls, encryption management, network protections, and operational security procedures when integrating or operating this product.

NextGen RF Design makes no guarantee against unauthorized access, cyber intrusion, jamming, spoofing, interference, or malicious exploitation resulting from improper configuration, insecure deployment, or adversarial activity.

Anti-Tamper & Reverse Engineering Notice

Unauthorized disassembly, reverse engineering, decompilation, modification, tampering, or alteration of the hardware, firmware, or software associated with this product is prohibited.

Such actions may void warranties, invalidate regulatory certifications, compromise operational performance, and violate applicable laws or licensing agreements.

Limitation of Liability

NextGen RF Design shall not be liable for any indirect, incidental, special, punitive, or consequential damages arising from the use of, inability to use, misuse of, or operational failure of this product, including but not limited to loss of data, mission failure, aircraft loss, operational downtime, business interruption, or loss of profits.

The user assumes all responsibility and risk associated with the installation, integration, operation, and use of this product in any application or environment.

In no event shall the total liability of NextGen RF Design exceed the original purchase price of the product.

Export Statement

This product, software, technology, and related documentation may be subject to United States export control laws and regulations, including the Export Administration Regulations (EAR) administered by the U.S. Department of Commerce and, where applicable, the International Traffic in Arms Regulations (ITAR) administered by the U.S. Department of State. Diversion contrary to U.S. law is prohibited.

The purchaser, user, and any subsequent transferee are responsible for complying with all applicable export laws, regulations, restrictions, and licensing requirements. This product shall not be exported, re-exported, transferred, or disclosed to prohibited end users, prohibited destinations, or for prohibited end uses without proper authorization from the United States Government.

NDAA Compliance Statement

ValkyrieC2™ is designed to support compliance with applicable United States Government procurement requirements, including Section 889 of the National Defense Authorization Act (NDAA), relating to restricted telecommunications and video surveillance equipment and services.

System integrators and end users remain responsible for validating full system-level compliance within their intended deployment architecture and supply chain.

TABLE OF CONTENTS

1	SAFETY & REGULATORY INFORMATION	8
1.1	RF EXPOSURE & ANTENNA SAFETY WARNING.....	8
1.2	OPERATIONAL RISK STATEMENT.....	8
1.3	POWER & ELECTRICAL SAFETY WARNING.....	8
2	VALKYRIEC2™ OVERVIEW	9
2.1	INTENDED USE & OPERATIONAL RESTRICTIONS.....	9
2.2	GENERAL DESCRIPTION	9
2.3	OPERATIONAL CHARACTERISTICS & FEATURES	10
2.4	LED & BUTTON DETAILS	11
3	PRODUCT OVERVIEW	13
3.1	TRANSMITTER (GCU).....	13
3.2	RECEIVER (AIR UNIT)	14
4	INSTALLATION GUIDE.....	15
4.1	INSTALLING THE TRANSMITTER (GCU).....	15
4.2	POWERING THE TRANSMITTER.....	15
4.3	EDGETX SETUP	16
4.4	FREEDOMTX SETUP	16
4.5	INSTALLING THE RECEIVER.....	17
4.6	BETAFLIGHT CONFIGURATION	17
4.7	BINDING AND VERIFYING	18
4.8	VIEWING LINK STATISTICS VIA OSD.....	19
5	SOFTWARE CONFIGURATION GUIDE	20
5.1	INSTALLING THE CONFIGURATION TOOL.....	20
5.2	CONNECTING AND CONFIGURING	21
5.3	GENERAL CONFIGURATION.....	22
5.4	POINTER BOXES.....	24
5.5	FIRMWARE UPDATES	25
5.6	AIR UNIT FIRMWARE UPDATE PROCEDURE	27
5.7	CONFIGURATOR MESSAGES AND CODES.....	28
5.8	UNINSTALLING THE CONFIGURATOR.....	29
5.9	LUA SCRIPT INSTRUCTIONS	30
5.10	FAILSAFE PARAMETERS	33
6	ORDERING INFORMATION & ACCESSORIES.....	34

APPENDIX A: TROUBLESHOOTING	35
APPENDIX B: KNOWN BUGS	36
APPENDIX C: SERVICE / SUPPORT AND WARRANTY STATEMENT	37
WARRANTY STATEMENT.....	38

TABLE OF FIGURES

Figure 1: Transmitter	13
Figure 2: GCU Dimensions	13
Figure 3: Receiver	14
Figure 4: Receiver Dimensions.....	14
Figure 5: Nano Module Bay Interface	15
Figure 6: Air Unit FC Interface	17

TABLE OF TABLES

Table 1: Terminology Definitions.....	9
Table 2: Operational Characteristics	10
Table 3: Transmitter Button Commands & LED Details	11
Table 4: Receiver Button Commands & LED Details	11
Table 5: OSD Link Statistic Definitions	19
Table 6: Configuration Options (1.3.1)	23
Table 7: Configurator Messages	28
Table 8: Lua Script Configuration Options (1.3.4).....	32

1 SAFETY & REGULATORY INFORMATION

1.1 RF EXPOSURE & ANTENNA SAFETY WARNING

This equipment generates, uses, and radiates radio frequency energy. Improper installation or operation may result in harmful interference or exposure to radio frequency energy levels exceeding applicable limits.

Users shall maintain a minimum separation distance of at least 20 cm (7.9 inches) between the antenna and all persons during operation unless otherwise specified by applicable regulatory approval documentation.

Only antennas, accessories, and transmission configurations approved by NextGen RF Design shall be used with this equipment. Unauthorized antennas or modifications may violate regulatory requirements and void the user's authority to operate the device.

1.2 OPERATIONAL RISK STATEMENT

Wireless communication performance may vary due to environmental conditions, terrain, interference, spectrum congestion, electromagnetic activity, adversarial electronic warfare activity, antenna placement, or other operational factors.

Users shall evaluate system performance within their intended operational environment and implement appropriate redundancy, failsafe behavior, operational procedures, and mission planning safeguards for mission-critical applications.

No wireless communication link should be considered guaranteed or uninterrupted under all operational conditions.

1.3 POWER & ELECTRICAL SAFETY WARNING

Improper power connection, incorrect voltage application, damaged cabling, or misuse of power sources may result in equipment damage, fire hazard, personal injury, or operational failure.

Only approved power sources, accessories, and cabling specified by NextGen RF Design shall be used with this product.

Users shall inspect all cables, connectors, antennas, and power systems prior to operation.

2 VALKYRIEC2™ OVERVIEW

The ValkyrieC2™ is designed to provide a long range, secure, adaptive command and control radio link for FPV and small UAS applications. The multi-band architecture allows for robust communications, providing advanced anti-jam technology to help maintain link integrity in demanding spectral environments.



2.1 INTENDED USE & OPERATIONAL RESTRICTIONS

ValkyrieC2™ is intended for professional use in unmanned systems, telemetry, command-and-control, communications, and related operational applications.

This product is not designed, certified, or intended for use in applications where failure could directly result in death, personal injury, or catastrophic property damage without appropriate system-level redundancy and operational safeguards.

Users are responsible for ensuring compliance with all applicable local, state, federal, and international laws and regulations governing operation of unmanned systems and radio frequency equipment.

2.2 GENERAL DESCRIPTION

ValkyrieC2™ is a configurable radio system, and is comprised of a transmitter (referred to as the GCU), as well as the receiver (also referred to as the AU). Transmitter/GCU and receiver/AU will be used interchangeably throughout this document. The transmitter can interface to various Radio Controllers via the Nano Module bay, and is configurable via USB-C with a custom configuration tool or using Lua Script with EdgeTX compatible controllers.

Table 1: Terminology Definitions

Term	Definition
AU	Air unit or commonly referred to as the receiver module, which is mounted on the sUAS
CRSF	TBS Crossfire communication protocol
C2	Command & Control
dBm	Decibel-milliwatts
GCU	Ground control unit, or commonly referred to as the transmitter.
GUI	Graphical User Interface
JR-Module Bay	A mounting configuration that is used on many radio-controllers.
MMCX	Micro-miniature coaxial RF connector
Nano Module Bay	A mounting configuration that is used on many radio-controllers.
RSSI	Received Signal Strength Indicator, typically in dBm
SMA	Sub-Miniature version A RF connector

2.3 OPERATIONAL CHARACTERISTICS & FEATURES

The following describes the key operational characteristics of the Valkyrie radio system.

Table 2: Operational Characteristics

Band	MAIN: 902-928MHz (ISM) TAC: **See factory for frequency details on tactical radio
RF Power	Transmitter: Selectable per radio TAC Radio: 50mW/100mW/250mW/500mW/1000mW/2000mW/3000mW MAIN Radio: 50mW/100mW/250mW/500mW/1000mW/2000mW Receiver: 126mW (telemetry enabled)
Receiver Sensitivity	-107 to -113 dBm
Antenna Connector	Transmitter: 2x SMA Receiver: 2x MMCX
Input Power	Transmitter: +6V to +13V (Nano Module Bay) +9V/3A (USB-C) Receiver: +5V to +13V (JST connector)
Power Consumption	Transmitter: 21 watts peak 6.42 watts average (Nano Module) Receiver: 1.25 watts peak 0.64 watts average
Interface Ports	Transmitter: 1x USB-C Receiver: 4-pin JST (Mating connector options: Wurth 665004113322 or JST SHR-04V) or solderable pads
Operating Temperature	-30°C to +60°C
Size	Transmitter: 3.754" x 2.119" x 0.85" (95.36mm x 55.85mm x 21.59mm) Receiver: 1.62" x 0.93" x 0.34" (41.15mm x 23.62mm x 8.64mm)
Weight	Transmitter: 2.85oz (80.80g) Receiver: 0.45oz (12.76g)

Important Features:

- Long range communications
- Dual radio operation
- Selectable RF Power for Transmitter
- LEDs on both transmitter & receiver for radio status
- Covert mode allows for disabling LEDs for night flying & operational flexibility
- Configure via custom configuration tool and/or Lua Scripts using Edge TX based controllers
- FW upgradeable via custom configuration tool
- Other important features coming soon!

2.4 LED & BUTTON DETAILS

The following tables detail the LED & button functionality.

Table 3: Transmitter Button Commands & LED Details

Command	LED Color		Current State
N/A	Solid Blue		Transmitter is searching for a previously connected receiver
N/A	Alternating Blue and Green		Transmitter is actively connecting to a receiver.
3s Press or LUA / GUI Activation	Flashing Orange		Transmitter is searching for a new connection. (Requires manual activation).
N/A	Solid Green		Transmitter is currently in flying state.
N/A	Flashing Green		Transmitter is currently in flying state without telemetry.
N/A	Solid Red		Transmitter is currently in fault state.
N/A	Flashing Blue		Transmitter is ready for firmware update.
N/A	RGB Cycle		Transmitter is currently performing an OTA update.
Button Command Timer	Flashing Cyan		1 flash: Normal Reset 3 flashes: Enter Binding Mode 5 flashes: Factory Reset

Table 4: Receiver Button Commands & LED Details

Command	LED Color		Current State
N/A	Solid Blue		Receiver is waiting for a connection.
N/A	Alternating Green and Blue		Receiver is actively connecting to a transmitter.
N/A	RGB Cycle		Receiver is currently in OTA update mode.
N/A	Solid Green		Receiver is connected.
N/A	Solid Red		Receiver is in failsafe / fault state.
Button Command Timer	Flashing Green and Blue		1 flash: Normal Reset 5 flashes: Factory Reset

Note: *When sending button commands, the moment the button is pressed, the LED(s) will go dark, after 1 second, 1 flash will occur. After 3 seconds, 3 flashes will occur. After 10 seconds, 5 flashes will occur. Release the button between flashes to execute your preferred command.*

3 PRODUCT OVERVIEW

3.1 TRANSMITTER (GCU)

The ValkyrieC2™ Ground Control Unit (GCU), also known as the transmitter, is the device that will be installed into a controller's Nano Module Bay. This will connect to any compatible radio controller and allow for communication with the ValkyrieC2™ Air Unit. The transmitter can be powered by either the radio-controller, or an external battery/power source via the USB-C connector.

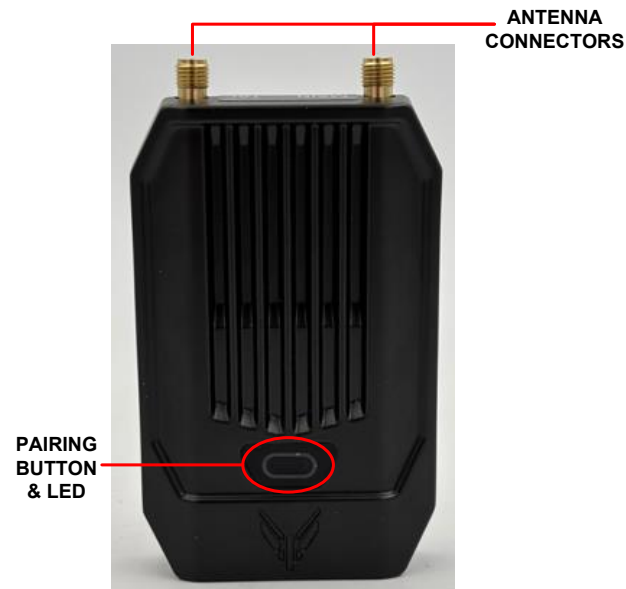


Figure 1: Transmitter

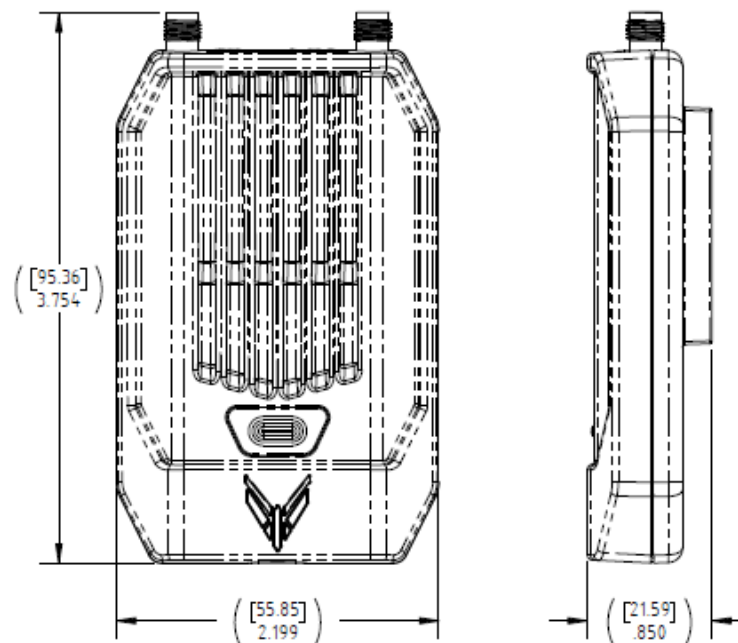


Figure 2: GCU Dimensions

3.2 RECEIVER (AIR UNIT)

The ValkyrieC2™ Air Unit, also known as the receiver, is the device that is installed on board the sUAS. It communicates with the flight controller and receives radio commands from the ValkyrieC2™ transmitter.

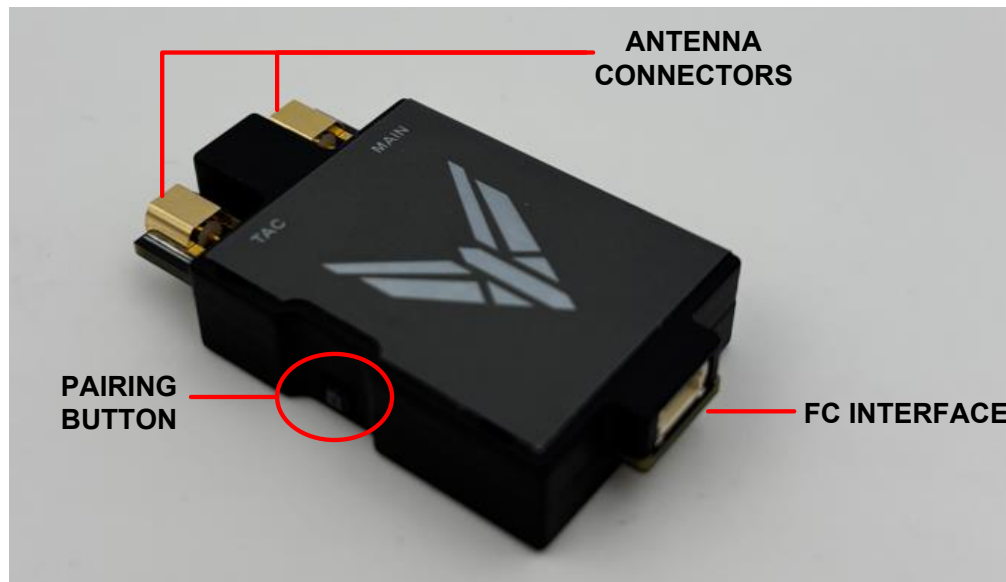


Figure 3: Receiver

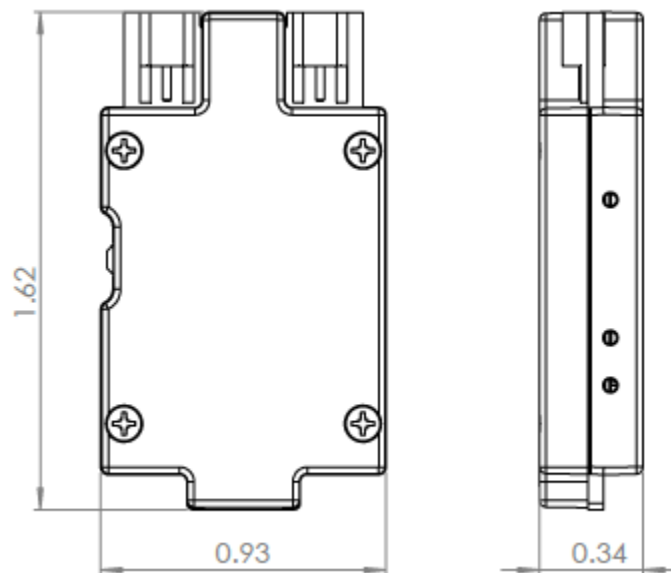


Figure 4: Receiver Dimensions

4 INSTALLATION GUIDE

4.1 INSTALLING THE TRANSMITTER (GCU)

The GCU by default supports the Nano Module Bay. If interface to a controller using the JR-Module Bay is required, contact NextGen RF for possible options. Most consumer radio controllers offer at least one of these module bay options.

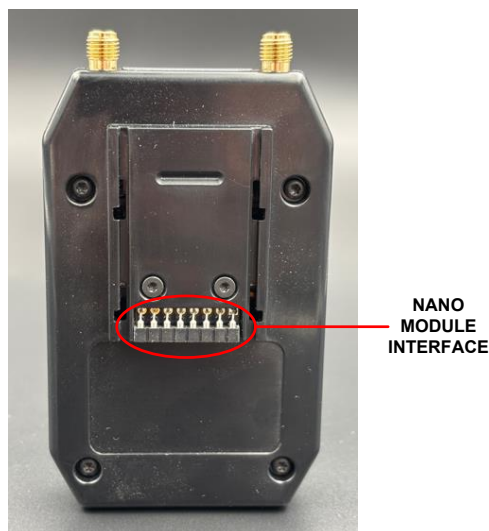


Figure 5: Nano Module Bay Interface

Note: Ensure you have antennas connected to the SMA connectors on the GCU before powering.

4.2 POWERING THE TRANSMITTER

The transmitter can be powered by the radio controller's module bay or by an external USB-C power source. Before use, verify your radio-controller's module bay power supply can support the maximum operating power required. If it cannot, reduce the transmitter's RF power level in software to reduce its power consumption or use an external USB-C power source. See "Operational Characteristics" for exact details on power consumption.

WARNING: If your radio controller is powered by a single-cell battery or uses a voltage regulator for the module bay, you **MUST** use an external USB-C power source capable of supplying at least 2S voltage (7.4V or higher). Operating the transmitter on insufficient voltage may damage both the radio controller and the transmitter. Prolonged operations under high stress can also reduce the service life of both devices.

4.3 EDGETX SETUP

The transmitter is compatible with both OpenTX and EdgeTX. For this user manual, the instructions outlined here will reference a Radiomaster TX16S running EdgeTX (v2.11.1 “Jolly Mon”) to connect to the transmitter. Follow the step-by-step guide to ensure that you are properly configured to use the transmitter with your radio controller.

- 1) Go to Model -> Model Setup and make sure Internal RF is set to OFF.
- 2) In the Model Setup page, enter the External RF page, set the mode to CRSF, and additionally set the baud rate to 400k.
- 3) In the Model Setup page, scroll down to OTHER, and disable the ADC filter.
- 4) Setup is complete.

4.4 FREEDOMTX SETUP

The transmitter is compatible with FreedomTX, and for the purpose of this user manual, the instructions outlined here will reference the TBS Tango II running FreedomTX (TBS-1.3.5) to connect to the transmitter. Follow the step-by-step guide to ensure that you are properly configured to use the transmitter with your radio.

- 1) Step 1: Go to Setup then scroll down and enable the External RF to CRSF mode.
- 2) Setup is complete.

Note: *Radio-controller setup procedure will vary from controller to controller and will additionally depend on what version of EdgeTX and FreedomTX you are currently using. Following the standard procedure of installing an external module using CRSF communication protocol is the baseline for properly configuring the transmitter.*

Note: *The controller will not indicate whether a module is connected, nor will it indicate the current link status.*

4.5 INSTALLING THE RECEIVER

The Air Unit contains a JST SH/SR connector, as well as exposed pads on the bottom to allow the user flexibility in the installation/interface of the radio to any flight controller. The Rx and TX port should be wired to an available UART on the flight controller. RX to flight controller TX and TX to flight controller RX.

Note: Ensure you have antennas connected to the MMCX connectors on the receiver before powering.

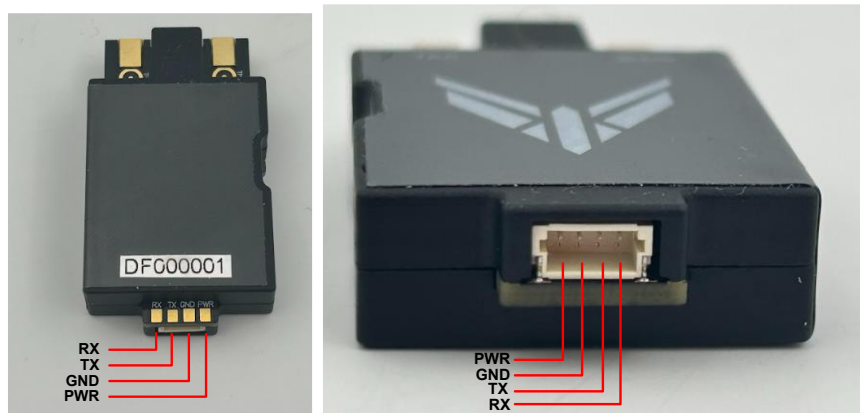
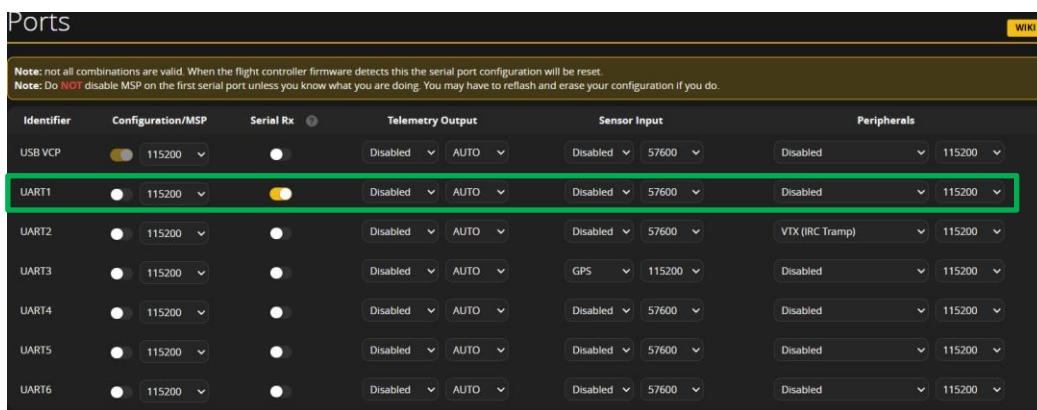


Figure 6: Air Unit FC Interface

4.6 BETAFLIGHT CONFIGURATION

For this guide, the Rotor Riot Brave F7 flight controller running Betaflight 4.5.2 will be used as the configuration example. Based on the specific flight controller being used, be sure to determine which UART the receiver will be connected to. For this example, UART 1 was selected. Follow the step-by-step guide for configuration via Betaflight to ensure the air unit operates properly.

- 1) Select the UART which is connected to the receiver's TX in the Betaflight's **Ports** tab.



- 2) In Betaflight's **Receiver** tab, select Serial (Via UART) for the receiver mode, and select CRSF as the serial receiver provider.

Receiver

Serial (via UART) ▼

Receiver Mode

- The UART for the receiver must be set to 'Serial Rx' (in the *Ports* tab)
- Select the correct data format from the drop-down, below:

CRSF ▼

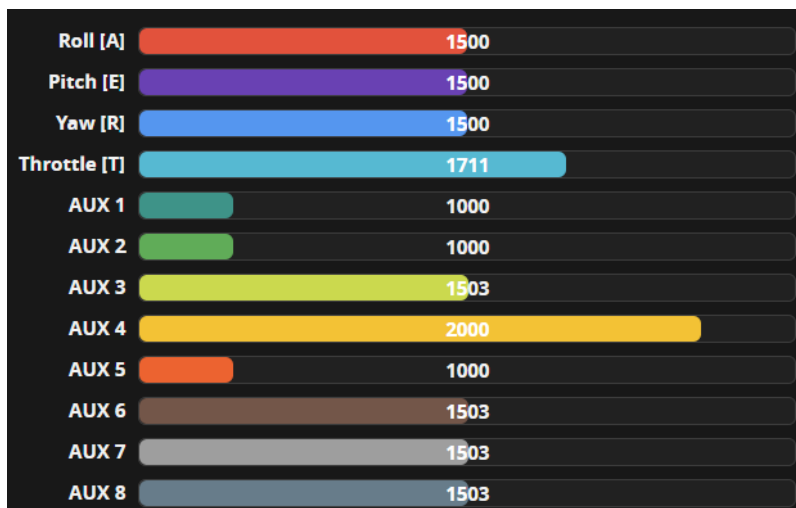
Serial Receiver Provider

Some Receiver Providers are not supported by current Build Configuration.

3) Betaflight radio-configuration is complete.

4.7 BINDING AND VERIFYING

While still in the Betaflight **Receiver** tab, power on the transmitter, then power the receiver. Bind the radios by holding the button on the transmitter for 3 seconds to enter binding mode. The transmitter will connect to any receiver in the area that is powered on. Once the units have been bound, they will re-connect automatically. If binding was successful, you can view your RC inputs using Betaflight's RC channel viewer once the LEDs are set to green indicating you are in the **Flying** state.



Note: During binding only one GCU and one AU should be powered. Otherwise, the GCU or AU may connect to the wrong partner.

4.8 VIEWING LINK STATISTICS VIA OSD

The Valkyrie Air Unit can transmit link statistics to the flight controller to be displayed in the OSD. Selectable options include: **RSNR Value**, **RSSI dBm Value**, **transmitter power**, and **Link Quality**.

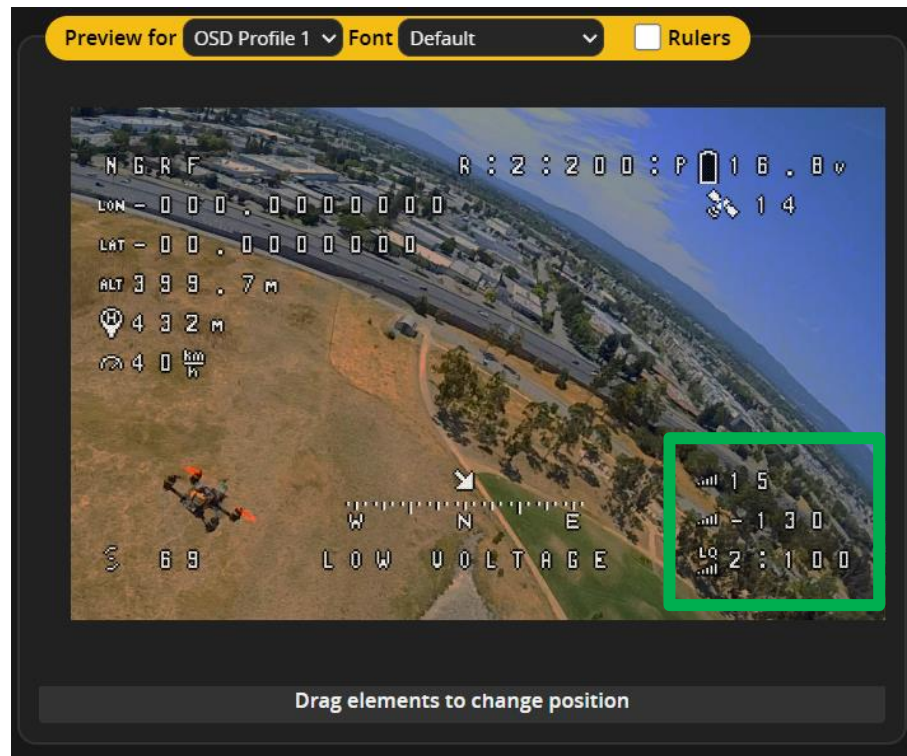


Table 5: OSD Link Statistic Definitions

Element Type	Display Style	Description
Link Quality	Radio Mode # : Link Quality %	Radio Mode #: 5 = 45Hz mode, 6 = 35Hz mode, 7 = 20Hz mode. Link Quality %: Represents how many packets are successfully being received.
RSNR	RSNR Value (dB)	Represents the current signal to noise ratio in dB.
Tx Power	Transmit Power (mW, W)	Displays the transmit power. Whichever radio is set highest will be shown.
RSSI Value	RSSI Value (dBm) : Current Radio #	RSSI Value (dBm): Indicates the signal strength level received by the radio. Current Radio #: A value of '1' indicates you are flying with the TAC radio. '2' indicates you are flying with the MAIN radio.

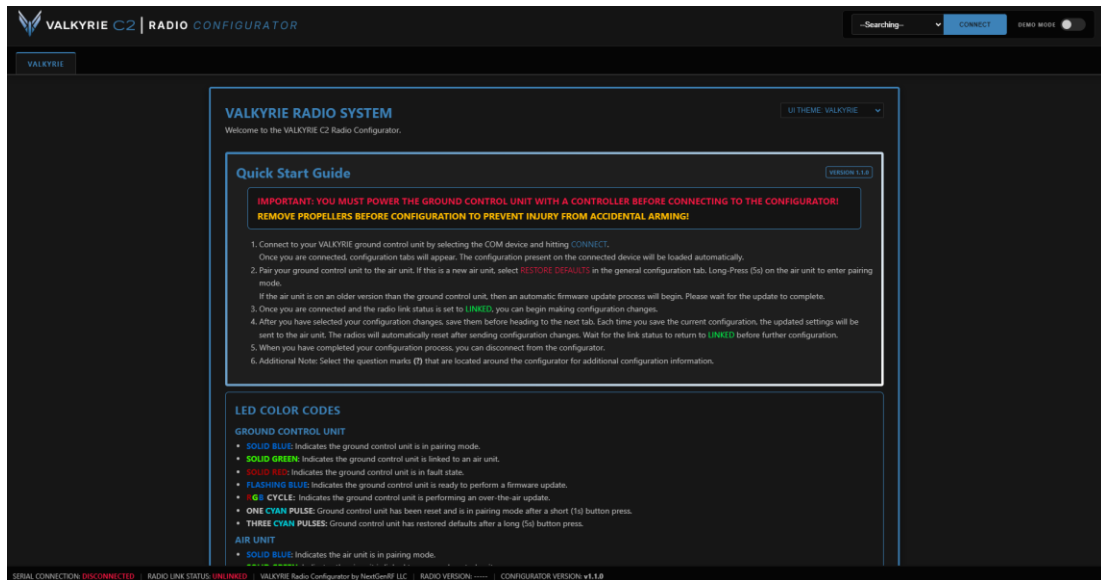
Note: LQ, RSSI, and RSNR are only shown based on the current radio being used.

Note: Betaflight limits Tx Power value to 2W. If 3W mode is set, it will still appear as 2W in the OSD.

5 SOFTWARE CONFIGURATION GUIDE

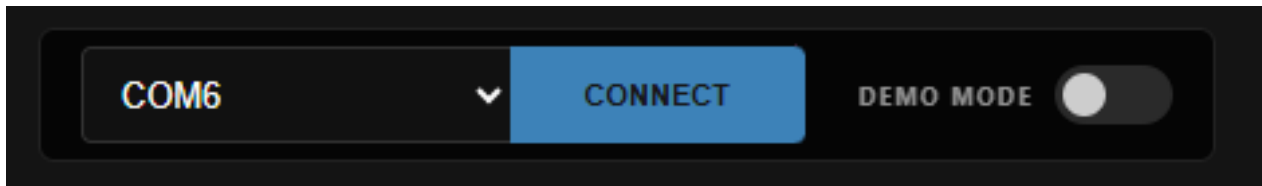
5.1 INSTALLING THE CONFIGURATION TOOL

- 1) Download the latest release from the NextGenRF website. In the asset's dropdown, download the latest setup file. Downloads can be found [here](#).
- 2) Run the setup file by double clicking the executable. You will be brought to a windows installation wizard. Once you complete the installation process, the configurator application will be available in your selected installation directory as **Valkyrie Radio Configurator**.
- 3) Open the application. Once opened you will be brought to the main page of the configurator. The main page includes important information regarding the current practice for getting started with a new system, troubleshooting help, and known bugs. This tab is always visible regardless of connection status.

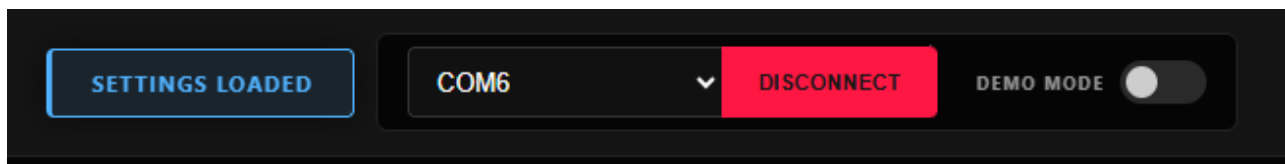


5.2 CONNECTING AND CONFIGURING

- 1) Connect your ground control unit to the PC with a USB-A to USB-C cable. USB-C to USB-C cables are not guaranteed to work with all PCs. The USB-C connector is located at the bottom of ground control unit.



- 2) Connect to the GCU by hitting the **CONNECT** button. The configurator will automatically detect if the correct COM device is selected. If the correct device is selected, the configuration will automatically be retrieved from the GCU, and you will be able to access all configuration options. If the **SETTINGS LOADED** toast appeared, the connection was successful. If you receive a **DEVICE SYNC FAILED**, ensure that you are connected to the correct COM port and that the GCU is being powered. Additionally, at the bottom bar of the UI, the serial connection status will indicate the current connection status.



SERIAL CONNECTION: **ACTIVE**

- 3) When connected, the full list of configurations tabs will appear towards the top of the UI. Select **GENERAL CONFIGURATION** to begin configuring your radio. If a radio mode is not currently selected, configuration options will remain unavailable.

Note: Before saving any configuration changes ensure the GCU has an active connection to the AU. This can be verified by checking for solid green LEDs on each unit.

Note: If telemetry is disabled configuration of other settings does not work until it is enabled. So before changing other settings enable telemetry and click save. With telemetry on these settings are now able to be changed. Telemetry can be disabled at the same time as other setting changes.

5.3 GENERAL CONFIGURATION

The first configuration tab is the **GENERAL CONFIGURATION** tab. This contains all common configuration options available on the Valkyrie radio system. It includes parameters such as radio operating mode, band and channel options, output power, and system actions.

RADIO OPERATING MODE ?
Single Radio - Tactical

RADIO CONFIGURATION ?

TACTICAL RADIO CONFIGURATION
OUTPUT POWER
Minimum Power
TELEMETRY
Disabled

MAIN RADIO CONFIGURATION
OUTPUT POWER
Minimum Power
TELEMETRY
Disabled

GLOBAL SETTINGS ?

COVERT MODE ☐

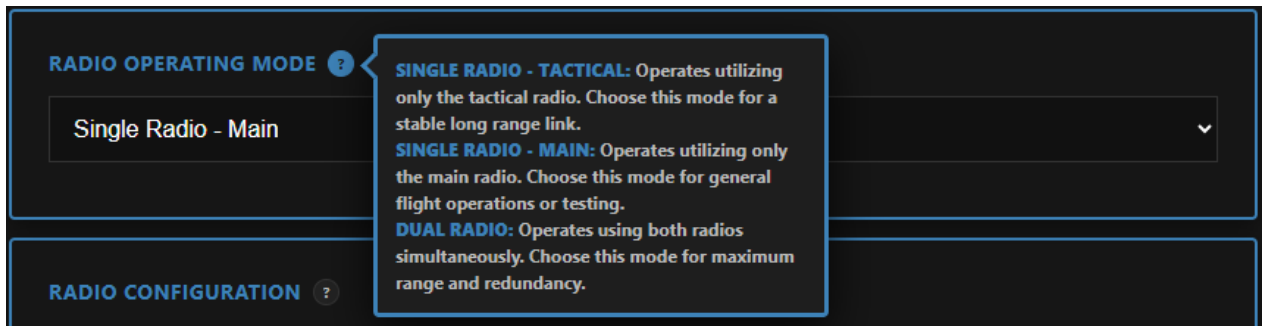
PACKET RATE 45Hz (-107dBm)

Table 6: Configuration Options (1.3.1)

Configuration Option	Description	Arguments
Radio Operating Mode	Select which radio mode to use.	Tactical, Main, Dual
Output Power	Select the output power in milliwatts for each radio. Only selected radio can be configured.	Tactical Radio: Minimum (about 50mW) 100mW, 250mW, 500mW, 1000mW, 2000mW, 3000mW Main Radio: Minimum (about 50mW), 100mW, 250mW, 500mW, 1000mW, 2000mW
Telemetry	Enable or disable telemetry from the air unit. Selectable by radio.	Enabled, Disabled
Covert Mode	Disables LEDs on the air unit.	Enabled, Disabled
Packet Rate	Determines how frequently new RC data is sent to the flight controller. Lower packet rates offer better range; higher packet rates offer better flight performance.	45Hz (-107dBm), 35Hz (-110dBm), 20Hz (-113dBm)
Factory Reset	Resets ground control unit to default parameters.	Single Action
Reset	Resets both the ground control unit and air unit, does not restore defaults.	Single Action
Enter Binding Mode	Put the ground unit into binding mode.	Single Action
Save	Save the current configuration to the radios. The device will automatically reset.	Single Action

5.4 POINTER BOXES

Next to selectable configuration options, there will be a small  that can be selected. The pointer boxes provide a description of the configuration options available in that section.



5.5 FIRMWARE UPDATES

The Valkyrie Radio Configurator has a built-in firmware update tool for the GCU. The tool will be kept up to date with the latest firmware versions compatible with the current configurator. Please refer to the step-by-step guide below to correctly perform a firmware update.

- 1) Connect to a VALKYRIE radio and open the **Firmware Update Tool** tab.

The screenshot shows the 'FIRMWARE UPDATE TOOL' interface. At the top, there's a section titled 'Firmware Update Procedure' with a list of six steps: 1. Ensure connection to a VALKYRIE ground control unit. 2. Select target firmware version from the dropdown or choose 'Manual' for a local file. 3. Enter firmware update mode by pressing 'PREPARE DEVICE'. 4. Start the flash; once completed, the device will auto-reset. 5. Firmware update complete; wait for the device to reset. 6. After the update, long press (10s) the buttons on each unit. Below this is a red warning box: 'IMPORTANT: CONFIGURATOR v1.3.1 ONLY COMPATIBLE WITH RADIO FIRMWARE v10.001! 1. Do not flash a 9.xxx firmware radio with 10.xxx, contact NextGenRF for support.' Underneath is a 'TARGET FIRMWARE VERSION' section with a dropdown menu currently showing '-- SELECT FIRMWARE VERSION --'. Below the dropdown is a large blue button labeled 'PREPARE DEVICE'. Underneath that is a progress bar and the text 'UPDATER READY'. At the bottom is a large blue button labeled 'START FLASH'.

- 2) Select the latest release in the target firmware dropdown or manually select a compatible firmware file from your file system.

Note: Use caution when selecting a manual firmware file, ensure it is an official NGRF release for the ValkyrieC2™ Radio.

- 3) Prepare the device. A toast will appear on the top right of the screen, and the LED on the GCU will start blinking blue.

The screenshot shows the bottom status bar of the configurator. It contains a button labeled 'PREPARING DEVICE...', a dropdown menu showing 'COM6', a red button labeled 'DISCONNECT', and a toggle switch labeled 'DEMO MODE' which is currently turned off.

- 4) Hit **START FLASH** to begin the firmware update. The GCU will automatically reset when the update is complete. Do not power off the GCU during the update! Follow the steps outlined in the configurator to ensure the firmware update process will be completed successfully.

FIRMWARE UPDATE TOOL

Firmware Update Procedure

1. Ensure you are connected to a VALKYRIE ground control unit.
2. Select the target firmware version from the dropdown, or choose "Manual" to use a local file.
3. Enter firmware update mode by pressing "**PREPARE DEVICE**". Once the blue LED starts blinking, firmware update mode is ready.
4. Start the flash. Once completed, the device will auto-reset. **DO NOT DISCONNECT WHILE FLASHING!**
5. Firmware update complete! Please wait for the device to reset.
6. After the firmware update, long press (10s) the buttons on each unit.

IMPORTANT: CONFIGURATOR v1.3.1 ONLY COMPATIBLE WITH RADIO FIRMWARE v10.001!

1. Do not flash a 9.xxx firmware radio with 10.xxx, contact NextGenRF for support.

TARGET FIRMWARE VERSION

Legacy Release (v10.001) ▼

PREPARE DEVICE

WRITING FIRMWARE: 4%

START FLASH

- 5) Once the firmware update is completed, the device will automatically reset, and you can resume configuration. If the device does not automatically reset, you may need to power cycle. To complete the update process, hold the button for 10 seconds on the GCU to set factory defaults.

Note: After a firmware update is made on the GCU, it is very likely that all air units will also need to be updated.

5.6 AIR UNIT FIRMWARE UPDATE PROCEDURE

Air unit firmware updates are entirely automatic. Anytime a GCU detects that an air unit is on an older firmware version, it will automatically push the firmware update over-the-air to the air unit. If you are not connected to the configurator, the GCU will cycle between red, green, and blue, indicating an OTA update is in progress. If you are connected to the configurator, configuration will be blocked and a banner will appear at the bottom of the screen indicating the current OTA firmware update progress. Please wait for the update to be completed before powering off the GCU or air unit or attempting to make configuration changes. Disconnecting from the configurator will not stop the OTA update. Once an OTA update has been completed successfully, you will be prompted to restore defaults on both units. Rebind after restoring defaults to complete the firmware update process.

Note: If the OTA update fails or is interrupted, the GCU will immediately attempt to restart the update. If it does not re-attempt the update, power-cycle both units. If it still does not update, hold the buttons for 10 seconds on each unit to set factory defaults. Then hold the button on the transmitter for 3 seconds to rebind.

VALKYRIE RADIO SYSTEM
Welcome to the VALKYRIE C2 Radio Configurator.

UI THEME: VALKYRIE

Quick Start Guide
VERSION 1.3.1

1. Connect to your VALKYRIE ground control unit by selecting the COM device and hitting **CONNECT**.
Once you are connected, configuration tabs will appear. The configuration present on the connected device will be loaded automatically.
2. Connect your ground control unit to the air unit. If you are attempting to connect to a new air unit, press **ENTER BINDING MODE**. The GCU should immediately start connecting to the new unit. Future connections will occur automatically after bound.
3. Once you are connected and the radio link status is set to **CONNECTED**, you can begin making configuration changes.
4. After you have selected your configuration changes, save them before heading to the next tab. Each time you save the current configuration, the updated settings will be sent to the air unit. The radios will automatically reset after sending configuration changes. Wait for the link status to return to **CONNECTED** before further configuration.
5. When you have completed your configuration process, you can disconnect from the configurator.
6. Additional Note: Select the question marks (?) that are located around the configurator for additional configuration information.

LED COLOR CODES
GROUND CONTROL UNIT

- **SOLID BLUE**: Indicates the ground control unit is waiting to connect.
- **ALTERNATING BLUE & GREEN**: Ground control unit is actively connecting to an air unit.
- **SOLID GREEN**: Indicates the ground control unit is connected to an air unit.
- **FLASHING GREEN**: indicated the ground control unit is connected to an air unit without telemetry.
- **SOLID RED**: Indicates the ground control unit is in fault state.
- **FLASHING BLUE**: Indicates the ground control unit is in fault state.
- **FLASHING ORANGE**: Indicates the ground control unit is in fault state.
- **RGB CYCLE**: Indicates the ground control unit is in fault state.
- **ONE CYAN PULSE**: Ground control unit has successfully connected to an air unit.

AIR UNIT OTA FIRMWARE UPDATE PROGRESS: 2 / 63

5.7 CONFIGURATOR MESSAGES AND CODES

The configurator communicates to the user via a popup or a “toast” on the top right of the user interface, near the port select and connect buttons. It provides useful information regarding sending configuration changes, firmware updates, and other status updates while in the configurator.

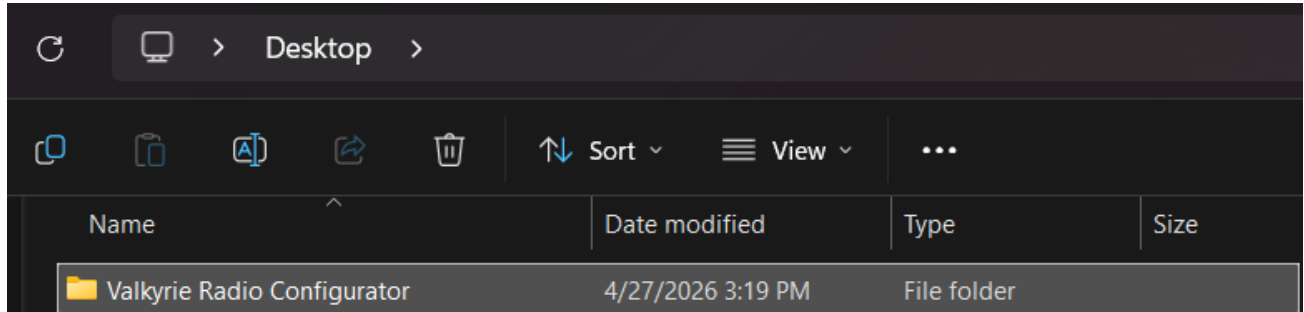
Table 7: Configurator Messages

Message	Type	Description
DEMO MODE STARTED	Status	Configurator has entered demo mode.
CHANGES SAVED (DEMO)	Status	Changes were saved while in demo mode.
SYSTEM_RESET (DEMO)	Status	System was reset while in demo mode
CONFIGURATION SAVED	Status	Configuration changes were successfully saved to the GCU.
SETTINGS LOADED	Status	GCU parameters were successfully read by the configurator.
PREPARING DEVICE	Status	Configurator is attempting to put the GCU into DFU mode.
FLASH STARTED	Status	Firmware flash process has started.
UPDATE COMPLETE	Status	Firmware flash process has completed
SELECT FILE FIRST	Warning	Attempted to start a firmware update with no file selected.
SELECT FIRMWARE VERSION	Status	Note to select a firmware version before flashing.
DISCONNECT FIRST	Warning	Attempted to enter demo mode while connected to a GCU.
CONNECT_DEVICE FIRST	Warning	Attempted to write a configuration before connecting (hidden)
NO PORT SELECTED	Warning	Attempted to connect to a device without selecting the port first.
DEVICE SYNC FAILED	Warning	Failed to read the configuration on the GCU.
DEVICE NOT RESPONDING	Error	Device is not responding to configurator commands.
FW UPDATES DISABLED IN UI PREVIEW	Warning	Attempted to start a firmware update while in demo mode.
OTA UPDATE FAILED	Error	OTA update was interrupted and failed to complete.

5.8 UNINSTALLING THE CONFIGURATOR

To uninstall the ValkyrieC2™ Radio Configurator, follow this step-by-step guide.

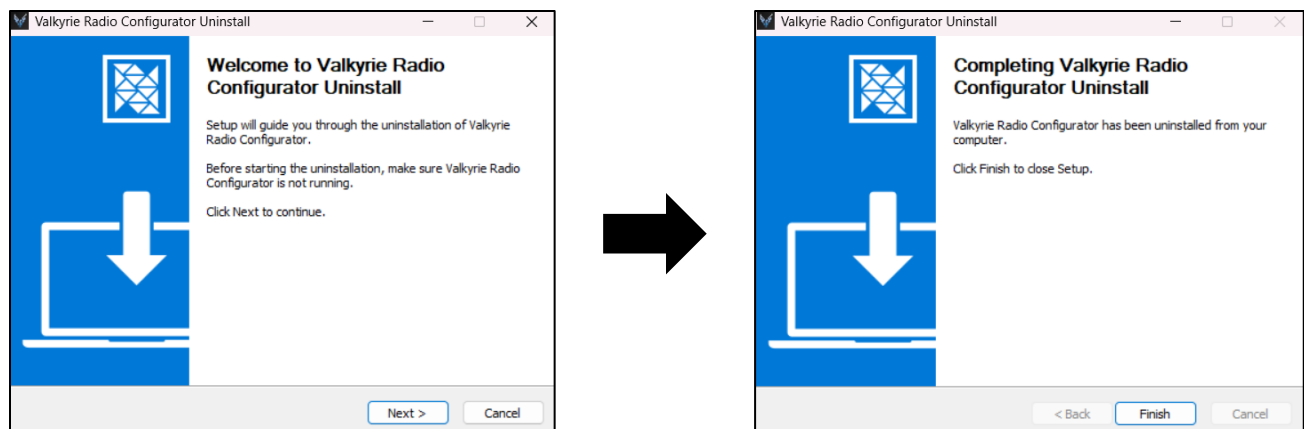
- 1) Locate the installation directory you selected when initially installing the configurator. In this example, it was located on the desktop.



- 2) Enter the Valkyrie Radio Configurator Folder and locate the executable named *Uninstall Valkyrie Radio Configurator.exe*. Run the executable.

snapshot_blob.bin	4/27/2026 3:18 PM	BIN File	271 KB
Uninstall Valkyrie Radio Configurator.exe	4/27/2026 3:18 PM	Application	214 KB
v8_context_snapshot.bin	4/27/2026 3:18 PM	BIN File	628 KB

- 3) An uninstallation wizard will appear. Simply hit *next* to uninstall the configurator, once complete, you can hit *finish*.



Note: An empty folder where the configurator contents reside may persist, you can delete the empty folder.

5.9 LUA SCRIPT INSTRUCTIONS

The ValkyrieC2™ Lua Script allows configuration changes to the Valkyrie radio system using commands sent directly from the controller. The ValkyrieC2™ Lua Script can send the same commands as the Valkyrie Configuration tool.

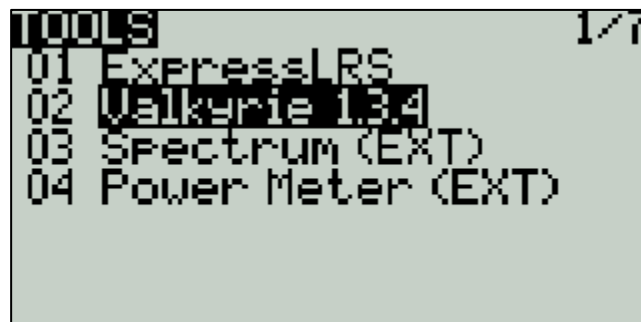
The latest Lua Script named “NGRF Valkyrie” is supported on the most recent version of EdgeTX (v2.11.3 “Jolly Mon”).

Follow the step-by-step instructions to install the ValkyrieC2™ Lua Script to your EdgeTX controller.

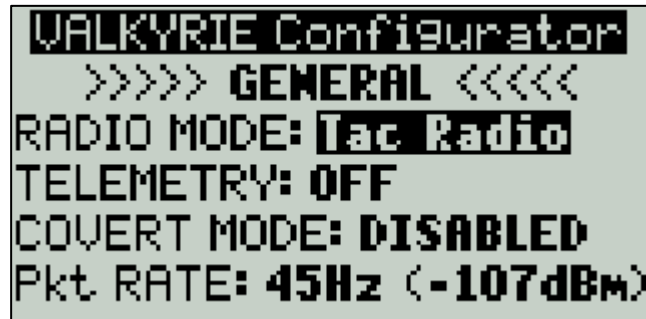
- 1) Download the provided “NGRF Valkyrie” Lua Script and Lua source file to your computer. Downloads can be found [here](#). Lua scripts are defined by the screen size of the controller they are meant to operate with. For example, a Radiomaster pocket has a 128x64 screen size, so you will select *version_C2_128x64*.
- 2) Connect your powered radio controller to your computer, you will be prompted to either use USB Joystick, USB Storage, or USB Serial. You will need to select USB Storage.
- 3) In File Explorer, a new USB storage device will appear containing various folders that store all data on your radio-controller. For this guide, we are interested in the SCRIPTS folder.
- 4) Copy the Lua Script file you downloaded and paste them into the TOOLS folder, which is contained in the SCRIPTS folder. When complete, you can disconnect your radio controller from the computer.

Name	Date modified	Type	Size
ASTEROIDS	1/8/2025 3:41 PM	File folder	
BREAKOUT	1/8/2025 3:41 PM	File folder	
TBSAGENTLITE	1/8/2025 3:41 PM	File folder	
X-TRIS	1/8/2025 3:41 PM	File folder	
1.3.4_C2_128_64.lua	7/30/2026 9:20 AM	Lua Source File	24 KB
1.3.4_C2_128_64.luac	7/30/2026 9:20 AM	LUAC File	9 KB
elrsV3.lua	7/17/2026 2:32 PM	Lua Source File	30 KB
elrsV3.luac	7/17/2026 2:32 PM	LUAC File	16 KB
readme.txt	3/17/2023 9:57 AM	Text Document	1 KB

- 5) While on the main page of the radio controller, first press the [SYSTEM] button, then page onto the Tools menu. You will see a list of Lua Scripts currently loaded into your radio controller.



- 6) Scroll down to the “NGRF Valkyrie” Lua Script and press [ENTER]. You will then enter the ValkyrieC2™ Lua script. The Lua script will attempt to sync to the connected ValkyrieC2™ ground unit. **SYNC SUCCESSFUL** will appear if the configuration is loaded correctly, and **Fetch Failed** will appear if the sync was unsuccessful. If unsuccessful, you can re-attempt the sync.



```
WALKYRIE Configurator
>>>>> GENERAL <<<<<
RADIO MODE: Tac Radio
TELEMETRY: OFF
COVERT MODE: DISABLED
Pkt RATE: 45Hz (-107dBm)
```

You can scroll, select each option, and change the parameters in bold. Once you have selected the configuration options you like, you can select the [Save & Configuration] button, and the controller will give you haptic and audio feedback indicating that the configuration has been sent to the transmitter. You will need to wait for the ValkyrieC2™ to reconnect before flying.

Note: *Ensure you are connected to the AU before sending Lua Script commands. Do not send repeated commands in a short duration of time. Always wait for the radio system to reset. If the system fails to reconnect, hold the reset buttons on each unit for 10 seconds and try sending the configuration again.*

Note: *If telemetry is disabled configuration of other settings does not work until it is enabled. So before changing other settings enable telemetry and click save. With telemetry on these settings are now able to be changed. Telemetry can be disabled at the same time as other setting changes.*

Table 8: Lua Script Configuration Options (1.3.4)

Lua Configuration Option	Description	Arguments
Radio Operating Mode	Select which radio mode to use.	Tactical, Main, Dual
Output Power	Select the output power in milliwatts for each radio. Only selected radio can be configured.	Tactical Radio: Minimum (about 50mW) 100mW, 250mW, 500mW, 1000mW, 2000mW, 3000mW Main Radio: Minimum (about 50mW), 100mW, 250mW, 500mW, 1000mW, 2000mW
Telemetry	Enable or disable telemetry from the air unit. Selectable by radio.	Enabled, Disabled
Covert Mode	Disables LEDs on the air unit.	Enabled, Disabled
Packet Rate	Determines how frequently new RC data is sent to the flight controller. Lower packet rates offer better range; higher packet rates offer better flight performance.	45Hz (-107dBm), 35Hz (-110dBm), 20Hz (-113dBm)
Factory Reset	Resets ground control unit to default parameters.	Single Action
Reset	Resets both the ground control unit and air unit, does not restore defaults.	Single Action
Save Configuration	Save the current configuration to the radios. The device will automatically reset.	Single Action
Enter Binding Mode	Put the ground unit into binding mode.	Single Action
Kill Connection	Disables the connected air unit in case of interference.	Single Action
Exit Lua	Exit the Lua Script	Single Action

5.10 FAILSAFE PARAMETERS

Currently, the ValkyrieC2™ system is designed to failsafe when any of the scenarios are detected:

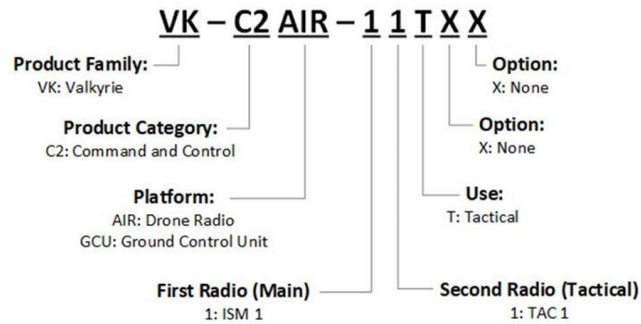
- Complete loss of radio-link seen by the receiver.
- Radio-controller is powered off while the sUAS is armed.
- Transmitter experiences a loss of power while sUAS is armed.
- The transmitter is physically removed from the module bay while the sUAS is armed.

The transmitter will continue to transmit RC data even if it loses telemetry from the receiver. Additionally, the receiver will continue to search and await a reconnection and re-arm from the pilot when a failsafe is issued. The transmitter and receiver will always remain connected even if a failsafe occurs, only when a power cycle is initiated will reconnection be required.

Further failsafe redundancy is handled by [Betaflight's failsafe system](#), which is by default set to activate when the flight controller sees an absence of control data. This system is activated when the receiver detects a failsafe and will not send RC data. If not using Betaflight, please read the failsafe protocol for your flight control firmware to ensure your sUAS will failsafe properly in the event of loss of control.

6 ORDERING INFORMATION & ACCESSORIES

The following describes the part number for the ValkyrieC2™ receiver & transmitter:



ITEM	P/N	NOTE
GCU (TRANSMITTER) 	VK-C2GCU-11TXX	GCU with ISM 1 band on main radio, TAC 1 band on tactical radio
AIR UNIT (RECEIVER) 	VK-C2AIR-11TXX	Air unit with ISM 1 band on main radio, TAC 1 band on tactical radio
1X GCU/5X AIR UNIT KIT	VK-C2KIT-11TX5	Kit containing 1x GCU, 5x Air units, 1x each TAC antenna (SMA & MMCX) **See w/NextGen RF regarding other kit options
TAC ANTENNA – SMA	ANT-021X-030	TAC band antenna, connects directly to the GCU, 3" cable
TAC ANTENNA - MMCX	ANT-022X-060	TAC band antenna, connects directly to the Air Unit, 6" cable
MAIN/ISM ANTENNA – SMA	ANT-011X-030	Main/ISM band antenna, connects directly to the GCU, 3" cable
MAIN/ISM ANTENNA – SMA	ANT-012X-060	Main/ISM band antenna, connects directly to the Air Unit, 6" cable

APPENDIX A: TROUBLESHOOTING

The following table addresses common issues encountered during initial setup.

Symptom	Likely Cause	Resolution
LEDs do not illuminate	No power to the unit	Verify power connections. GCU requires +6V to +13V via module bay or +9V via USB-C. Air Unit requires +5V to +13V via JST connector.
Units will not connect (LEDs remain solid blue)	Units not bound, configuration mismatch, or weak signal	Press and hold the button for 10 seconds on each unit to restore defaults. Then re-enter binding mode with a 3 second button press.
Connected but no RC input in Betaflight	UART or receiver settings incorrect	Verify the correct UART is enabled for Serial RX in Betaflight Ports tab. Confirm receiver mode is set to Serial (via UART) and Serial Receiver Provider is set to CRSF.
Link drops or enters failsafe during operation	Insufficient power, antenna issue, or interference	Verify all antenna connections. Ensure adequate power supply to the GCU. Try a different channel or band using the Valkyrie Radio Configurator. See 5.2 of the user manual.
Configurator displays DEVICE SYNC FAILED	Incorrect COM port or GCU not powered	Verify the USB-C cable is connected. Select the correct COM port in the configurator. Ensure the GCU is receiving power. Only use USB A-to-C, C-to-C cables can cause connection issues.
Units cycle between UNLINKED, SEARCHING, CONNECTING	Configuration mismatch between GCU and Air Unit	Reset both units by pressing and holding the button for 1 second on each unit. Allow the units to reconnect.
OTA update repeatedly fails	Interference	10 second long press the button on both the GCU and air unit. Re-bind the units. Allow the radios to reconnect and re-attempt the OTA updates. Ensure no other radios are powered nearby that could be causing interference.

APPENDIX B: KNOWN BUGS

FW Version: v10.001

- LEDs may flicker the wrong color briefly on both the transmitter and receiver, especially during power-up and connection. Ensure you observe the LED for at least 1 second to determine radio state.
- Units may get stuck trying to connect if signal levels are inadequate, or a configuration change was unsuccessfully sent to the air unit.
 - In the configurator, the looping will appear as a link status rotation between UNLINKED, SEARCHING, CONNECTING, then back to UNLINKED.
- USB-C can be used for powering the GCU during flying but cannot be used during PC configuration.
- If multiple air units are bound to one GCU, they all must remain on the same radio to reconnect.
- Telemetry must be enabled to save configurations on the air unit.
- GCU remains in binding after power-cycling the unit. Factory reset the GCU to exit binding.

APPENDIX C: SERVICE / SUPPORT AND WARRANTY STATEMENT

Product Warranty, RMA, and Contact Information

NextGen RF guarantees that every ValkyrieC2™ system will be free from physical defects in material and workmanship for one (1) year from the date of purchase when used within the limits set forth in the specifications section of this manual.

The manufacturer's Warranty Statement is available on the following page. If the product proves defective during the warranty period, contact NextGen RF Customer Service to obtain a Return Material Authorization (RMA). You may also request an RMA by contacting support@nextgenrf.com.

RMA Request/Contact Customer Service

NextGen RF Design
2130 Howard Drive W
North Mankato, MN 56003
Tel: 507-514-6245

BE SURE TO HAVE THE EQUIPMENT MODEL AND SERIAL NUMBER AND BILLING AND SHIPPING ADDRESSES ON HAND WHEN CALLING.

When returning a product, mark the RMA clearly on the outside of the package. Include a complete description of the problem and the name and telephone number of a contact person. RETURN REQUESTS WILL NOT BE PROCESSED WITHOUT THIS INFORMATION.

For units in warranty, customers are responsible for shipping charges to NextGen RF. For units returned out of warranty, customers are responsible for all shipping charges. Return shipping instructions are the responsibility of the customer.

Product Documentation

NextGen RF reserves the right to update its products, software, or documentation without obligation to notify any individual or entity. Product updates may result in differences between the information provided in this manual and the product shipped. For the most current product documentation and application notes, visit www.NextGenRF.com.

Tech Support

NextGen RF Design
2130 Howard Drive W
North Mankato, MN 56003
Tel: 507-514-6245
E-mail: support@nextgenrf.com

WARRANTY STATEMENT

NextGen RF warrants to the original purchaser for use ("Buyer") that data telemetry products manufactured by NextGen RF ("Products") are free from defects in material and workmanship and will conform to published technical specifications for a period of, except as noted below, one (1) year from the date of shipment to Buyer. NextGen RF makes no warranty with respect to any equipment not manufactured by NextGen RF, and any such equipment shall carry the original equipment manufacturer's warranty only. NextGen RF further makes no warranty as to and specifically disclaims liability for, availability, range, coverage, grade of service or operation of the repeater system provided by the carrier or repeater operator. Any return shipping charges for third party equipment to their respective repair facilities are chargeable and will be passed on to the Buyer.

If any Product fails to meet the warranty set forth above during the applicable warranty period and is returned to a location designated by NextGen RF. NextGen RF, at its option, shall either repair or replace such defective Product, directly or through an authorized service agent, within thirty (30) days of receipt of same. No Products may be returned without prior authorization from NextGen RF. Any repaired or replaced Products shall be warranted for the remainder of the original warranty period. Buyer shall pay all shipping charges, handling charges, fees and duties for returning defective Products to NextGen RF or authorized service agent. NextGen RF will pay the return shipping charges if the Product is repaired or replaced under warranty, exclusive of fees and duties. Repair or replacement of defective Products as set forth in this paragraph fulfills all warranty obligations on the part of NextGen RF.

This warranty is void and NextGen RF shall not be obligated to replace or repair any Products if (i) the Product has been used in other than its normal and customary manner; (ii) the Product has been subject to misuse, accident, neglect or damage or has been used other than with NextGen RF approved accessories and equipment; (iii) unauthorized alteration or repairs have been made or unapproved parts have been used in or with the Product; or (iv) Buyer failed to notify NextGen RF or authorized service agent of the defect during the applicable warranty period. NextGen RF is the final arbiter of such claims.

THE AFORESAID WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NEXTGEN RF AND BUYER AGREE THAT BUYER'S EXCLUSIVE REMEDY FOR ANY BREACH OF ANY OF SAID WARRANTIES IS AS SET FORTH ABOVE. BUYER AGREES THAT IN NO EVENT SHALL NEXTGEN RF BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES WHETHER ON THE BASIS OF NEGLIGENCE, STRICT LIABILITY OR OTHERWISE. The purpose of the exclusive remedies set forth above shall be to provide Buyer with repair or replacement of non-complying Products in the manner provided above. These exclusive remedies shall not be deemed to have failed of their essential purpose so long as NextGen RF is willing and able to repair or replace non-complying Products in the manner set forth above.

This warranty applies to all Products sold worldwide. Some states do not allow limitations on implied warranties so the above limitations may not be applicable. You may also have other rights, which vary from state to state.

EXCEPTIONS

THIRTY DAY: Tuning and adjustment of telemetry radios

NO WARRANTY: Fuses, lamps, and other expendable parts

REVISION HISTORY

REV	DATE	REVISION DETAILS
1.0	6/4/2026	Initial Release
2.0	8/11/2026	Updated to support latest 10.1 release



ABOUT NEXTGEN RF

NextGen RF is a USA owned and operated engineering services company providing valuable wireless design expertise on a variety of products, ranging from design consultation to fully turnkey product development. Because we know design, NextGen RF has become the chosen partner for companies worldwide who require a high level of design expertise and responsiveness for their product development. We understand the difficulties of implementing RF solutions in designs and have a proven track record of helping clients efficiently meet their design objectives and requirements. We focus on process-oriented engineering from discovery and idea generation, definition of product requirements and specifications to design, verification and ultimately factory introduction. For more information visit www.nextgenrf.com