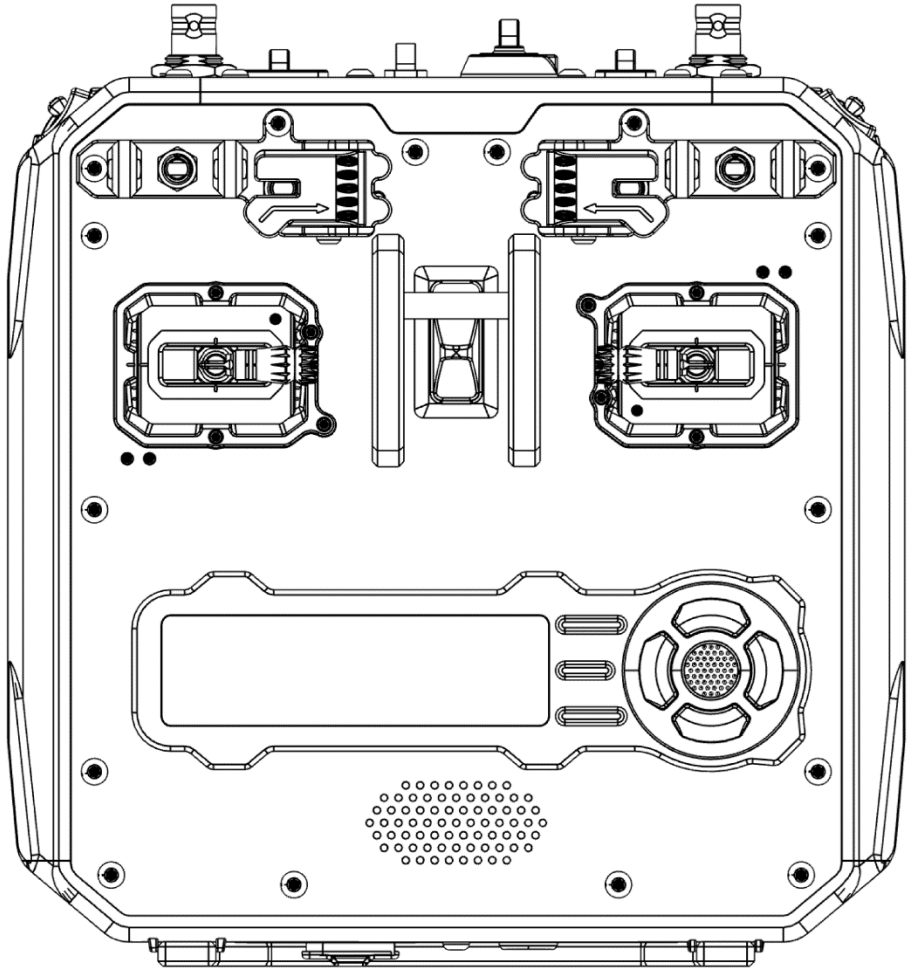
ORQA

TACTICAL REMOTE CONTROL

TAC.Ctrl



User Manual

Rev. 1.0 | May 2024

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1. DISCLAIMER

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2. INTRODUCTION

Thank you for purchasing the Orqa TAC.Ctrl. TAC.Ctrl is a tactical FPV (First Person View) remote controller that has been developed for enterprise and defense FPV drones. It is designed to keep FPV pilots safe from RF-based targeting, while providing EW-resilient drone control. In order for you to make the best use of your system and to fly safely, please read and understand this manual and its safety instructions before using this product. Failure to do so can result in serious injury or death. Adhering to these guidelines will help you avoid fire, explosions, electric shocks, and other hazards that may result in damage to property and/or severe or fatal injuries. Keep all safety information and instructions for future reference and pass them on to subsequent users of the product.

3. PRODUCT FEATURES

- Single cable connection to Orqa FPV.Pro goggles (power + analog/digital video) with mil-spec **Lemo** connector (TAC.Ctrl battery provides power to goggles)
- Single **RJ45** connection (MATRIX Port) to EW-resilient **IRONghost™** radio link (TAC.Ctrl provides power to remote radio)
- 6-cell 21700, 4000mAh Integrated Battery (Shipping-friendly **88Wh**)
- **RF-Silent** system, radios installed at end of single cable (up to **1km** long)
- Simulator support via **USB-C**, with Orqa FPV.Skydive (Berzerk Edition) simulator
- Robust, custom **aluminum gimbals**, with 3D Hall Sensors, familiar to FPV pilots
- Optional mounting bracket for local radio mounting
- **XT-60** Charge port for rapid charging from standard FPV drone battery chargers
- Innovative protected switches (x2) with auto-center
- 2x **Video output** ports for observer, and/or video recorder
- 2x Proportional sliders for smooth camera **gimbal control**
- 1.1kg weight with batteries

4. LAYOUT OVERVIEW

4.1. FRONT SIDE

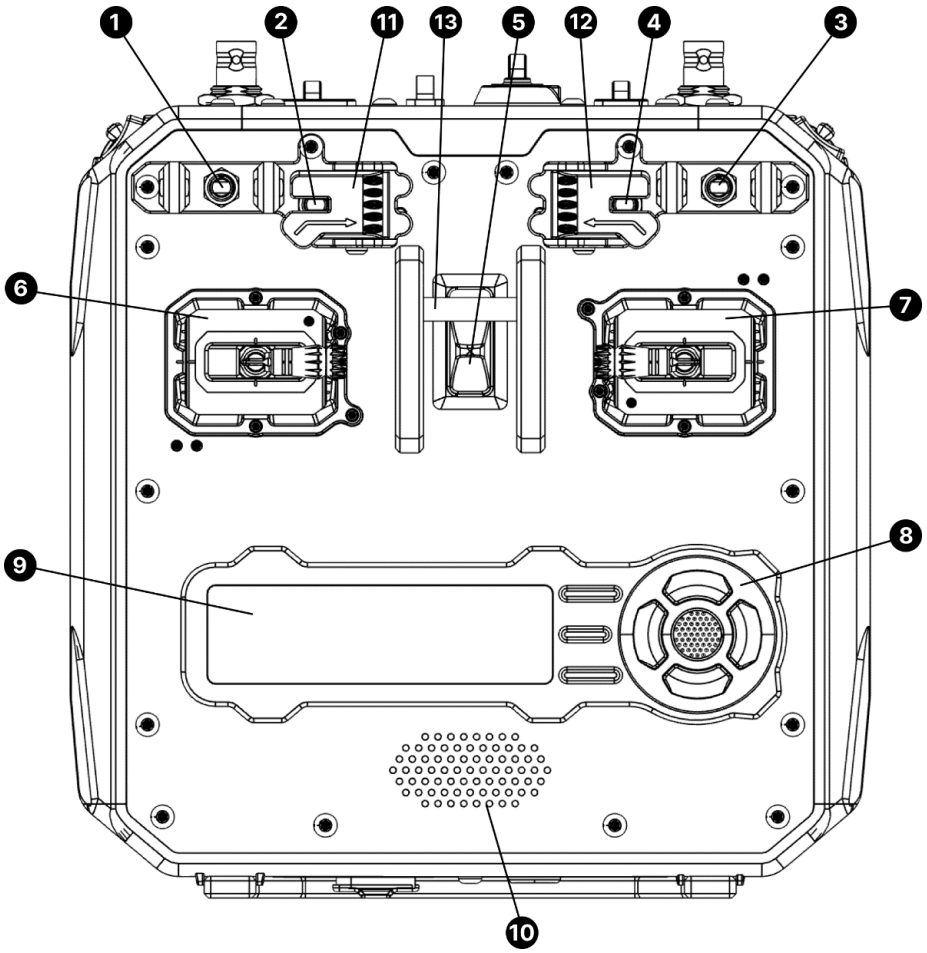

Fig. 1.a.: TAC.Ctrl front side layout

1.	Toggle switch, left	**(TL1)**	**8.**	Navigation menu buttons
2.	Toggle switch, center-left	**(TL2)**	**9.**	Screen
3.	Toggle switch, right	**(TR1)**	**10.**	Speaker
4.	Toggle switch, center-right	**(TR2)**	**11.**	Toggle switch cover, center-left
5.	Power On/Off switch		**12.**	Toggle switch cover, center-right
6.	Gimbal, left	**(GL)**	**13.**	Plastic hook rail
7.	Gimbal, right	**(GR)**		

Table 1: TAC.Ctrl front side features

4.2. TOP SIDE

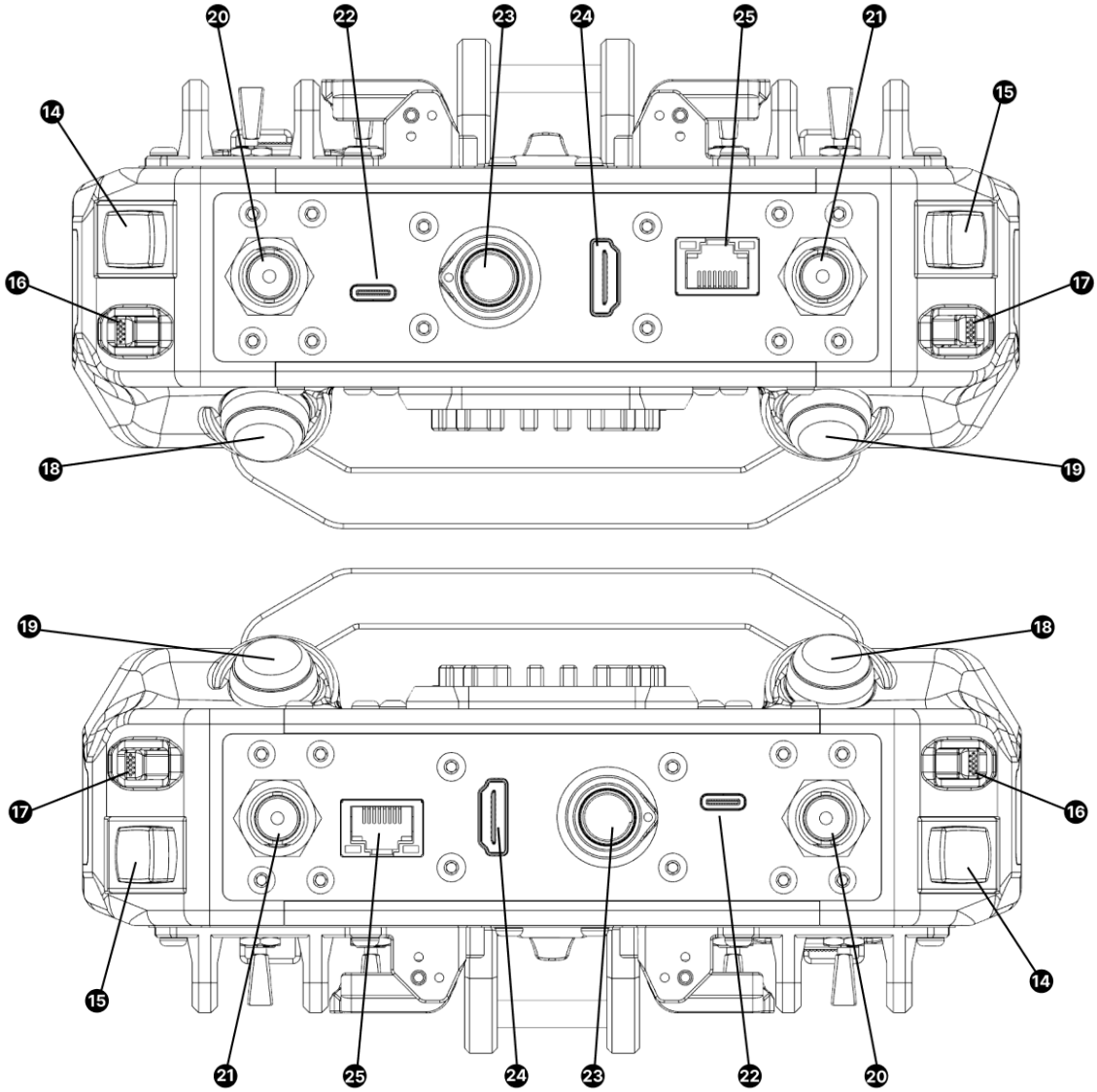

Fig. 1.b.: TAC.Ctrl top side layout

14.	Rocker switch, right	**(RR)**	**20.**	BNC connector, right
15.	Rocker switch, left	**(RL)**	**21.**	BNC connector, left
16.	Slider switch, right	**(SR)**	**22.**	HDMI port
17.	Sider switch, left	**(SL)**	**23.**	Lemo port
18.	Push button, right	**(BR)**	**24.**	HDMI port
19.	Push button, left	**(BL)**	**25.**	RJ45 port

Table 2: TAC.Ctrl top side features

4.3. BOTTOM SIDE

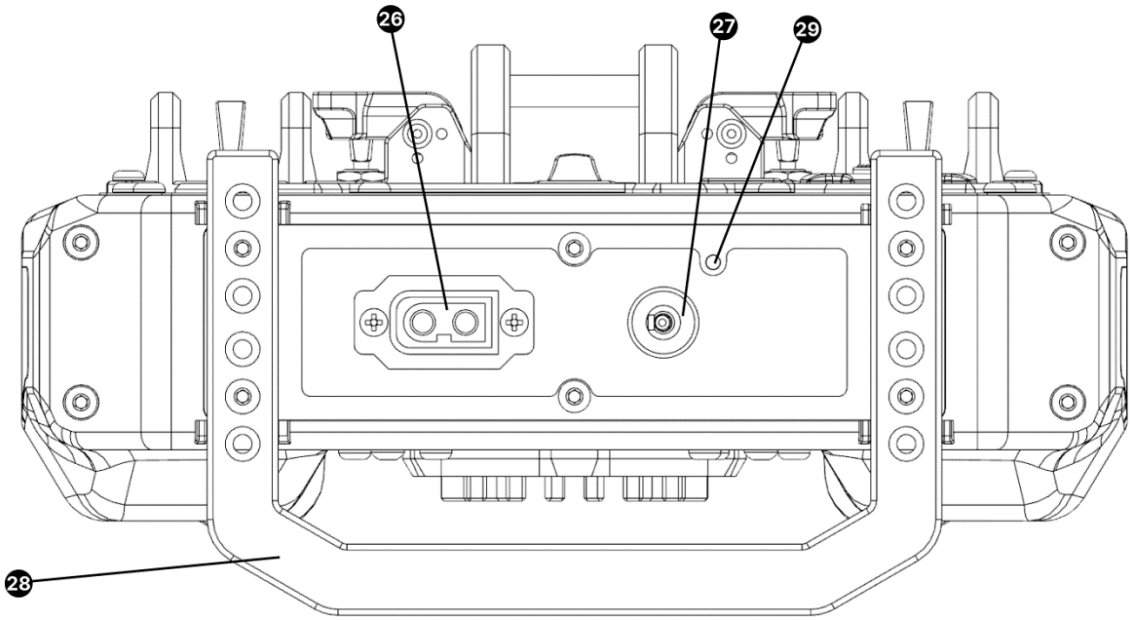

Fig 1.c.: TAC.Ctrl bottom side layout

26.	XT-60 connector (female)	**28.**	Bottom stand
27.	Barrel connector	**29.**	LED indicator

Table 3: TAC.Ctrl bottom side features

5. SWITCH FUNCTIONS

Toggle switch (TL (1,2) / TR (3,4))

3-way switches are used for various purposes, including changing the flight mode, pre-arming the drone, enabling/disabling the VTX as well as pre-arming and disarming the drone.

Rocker switch (RR (14) / RL (15))

Rocker switches (with 2 or 3 positions) are used for arming/disarming the drone, as well as controlling the cameras.

Slider switch (SR (16) / SL (17))

Slider switches are used for switching bands and controlling the cameras.

Push button (BR (18) / BL (19))

Push buttons are used for locking to the target and detonating the payload.

5.1. DEFAULT CONFIGURATION

Switch	Default config		Default position
TL1	Toggle switch, left	Three Positions	Up
TL2	Toggle switch, center left	Three Positions, protected	Center
TR1	Toggle switch, right	Three Positions	Up
TR2	Toggle switch, center right	Three Positions, protected	Center
RL	Rocker switch, left	Two Positions	Up Pressed
RR	Rocker switch, right	Three Positions	Up Pressed
SL	Slider switch, left	Proportional slider	*N/A*
SR	Slider switch, right	Proportional slider	*N/A*
BL	Push button, left	Push button, momentary	*N/A*
BR	Push button, right	Push button, momentary	*N/A*

Table 4: TAC.Ctrl switch functions

5.2. DETAILED OVERVIEW

Switch	Function	Position	Description
TL1	Flight Mode	Up	Activates acro mode
		Center	Activates angle mode
		Down	Activates position hold
TL2	Pre-Arm	Up	Activates drone Pre-Arming
		Center	Deactivates drone Pre-Arming
		Down	Activates drone Pre-Arming
TR1	VTX Control	Up	Turns the VTX Off
		Center	Turns the VTX On
		Down	Turns the VTX On High Power
TR2	Arm Payload	Up	Arms the payload
		Center	Disarms the payload
		Down	Arms the payload
RL	Arm	Up	Arms the drone
		Down	Disarms the drone
RR	Camera Selection	Up	
		Center	
		Down	
SL	Band Switch	*Up (press)*	
		Down (press)	
SR	Camera Tilt	*Up (press)*	Tilts the camera up
		Down (press)	Tilts the camera down
BL	Lock Target	*Press*	
BR	Detonate Payload	*Press*	

Table 5: TAC.Ctrl switch detailed overview

5.3. CONTROL CHANNEL ASSIGNMENTS

Channel	Switch	Default Configuration
CH1	GR, X axis	Roll
CH2	GR, Y axis	Pitch
CH3	GL, Y axis	Throttle
CH4	GL, X axis	Yaw
CH5	RL	Arm
CH6	TL1	
CH7	TL2	
CH8	TR2	
CH9	TR1	
CH10	RR	
CH11	BL	
CH12	BR	

Table 6: TAC.Ctrl control channel assignments

6. FUNCTIONALITY PREREQUISITES

Function	Switch	Channel	Prerequisite
Arm	RL	CH5	Two position rocker, arm switch
vTx Off/On/High Power	TR1	CH6	
Lock Target	BL	CH7	Required by proposed targeting autopilot
Detonate Payload	BR	CH8	Requires arm switch to be enabled first
Band Switch	SL	None	Toggle band up or down, 2 or 4 (depending upon Tx/Rx capabilities)
Model Switch (team race)		None	Should be on-screen for TAC.Ctrl, not occupying valuable channel
Flight Mode	TL1		Acro/Angle/Position Hold/etc.
Arm Munition	TR2		Pos 2 = Idle; Pos 1 or 3 = Arm
Pre-arm Drone	TL2		
Gimbal Control	SR		For ISR variants
Camera Selection	RR		F405 camera switch (e.g. forward or dropper)
Camera Tilt	SR		

Table 11: TAC.Ctrl functionality requirements

7. GIMBAL FUNCTIONS

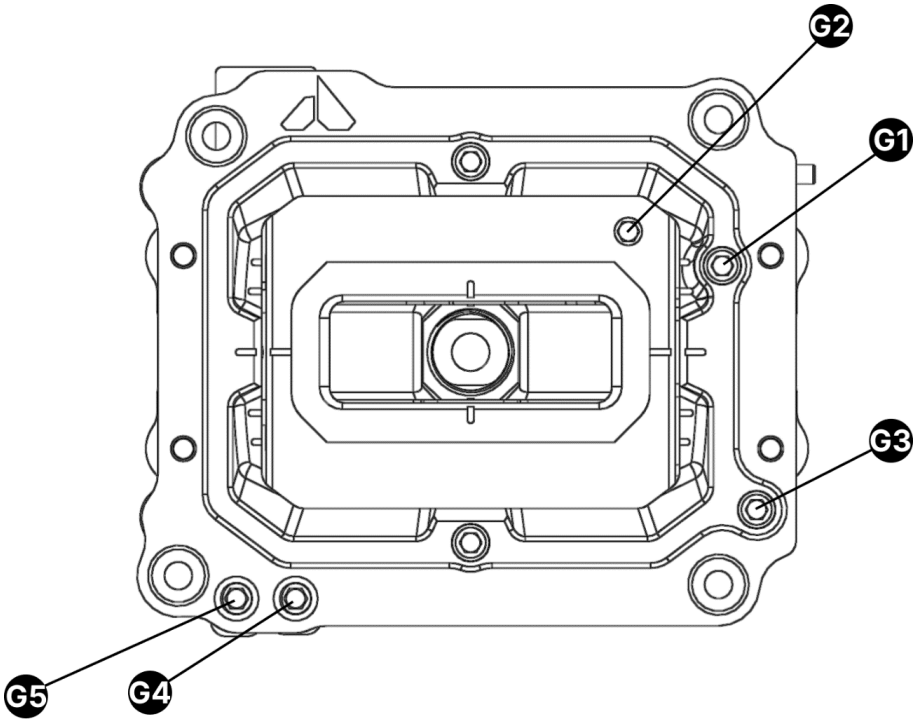

Fig 2.: TAC.Ctrl gimbal layout

G1.	Remove centering	**G4.**	Throttle resistance (Smooth)
G2.	Spring tension (Horizontal)	**G5.**	Throttle resistance (Detented)
G3.	Spring tension (Vertical)		

Table 7: TAC.Ctrl gimbal features

Robust, custom aluminum gimbals (6,7), designed by ORQA, with 3D Hall Sensors, are equipped with adjustable Y axis, self-centering and ratchet effect and resistance. Gimbals are calibrated out of the box, so no calibration is required. Left gimbal comes throttled out of the box.

If the gimbal is off-center or it was disassembled, recalibration is needed. Recalibration can be started in the TAC.Ctrl menu (Fig. 5.d.).

Gimbals can be adjusted from the front side of the controller using a 1.5mm hex driver by modifying the throttle resistance (G4,G5).

8. MENU FUNCTIONS

TAC.Ctrl has a built-in LED screen that can be navigated using the M1 - M5 menu buttons.

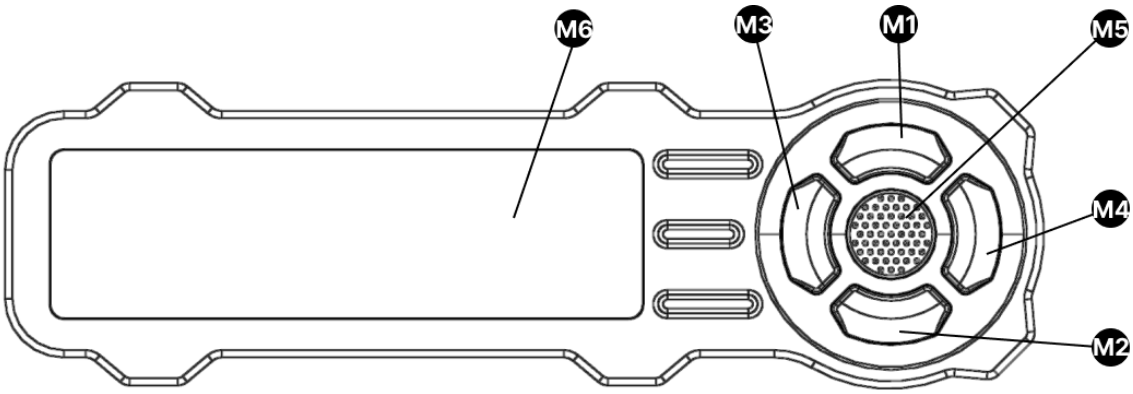

Fig 3.: TAC.Ctrl button layout

M1.	Up button	**M4.**	Right button
M2.	Down button	**M5.**	Enter / Next button
M3.	Left / Back button	**M6.**	Screen

Table 8: TAC.Ctrl menu table

8.1. NAVIGATION OVERVIEW

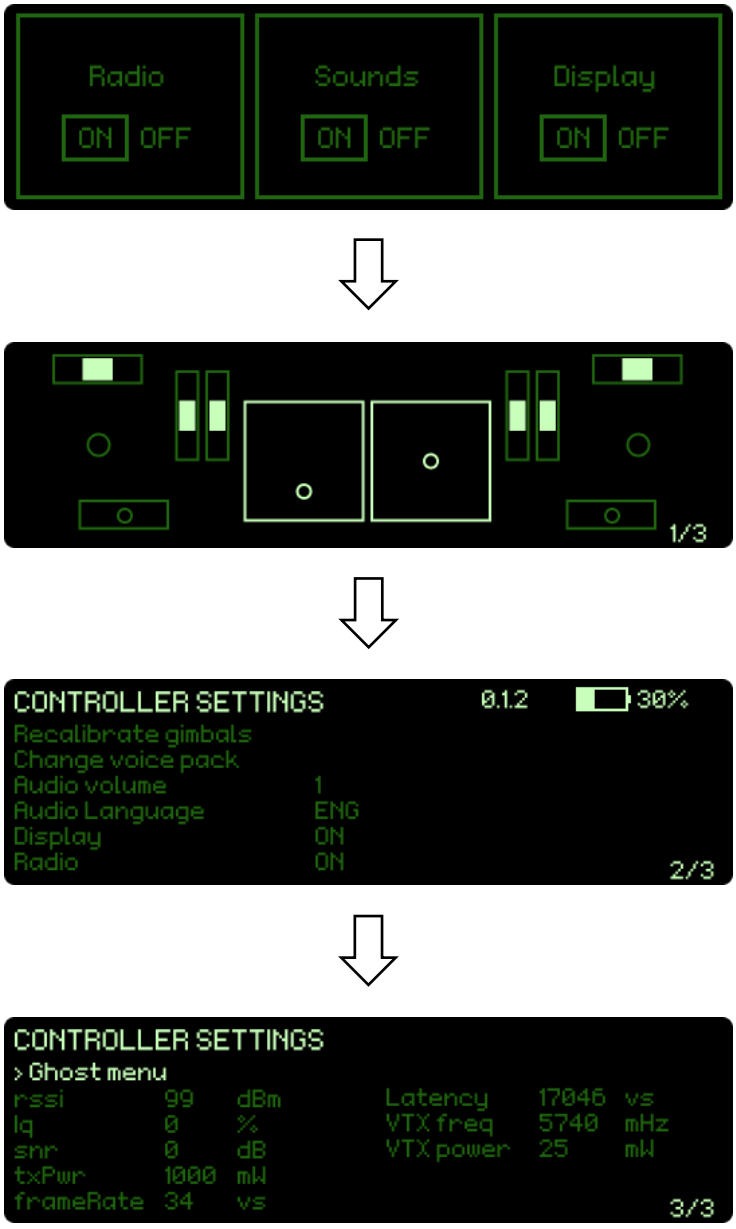

Fig 4.a.: TAC.Ctrl menu layout

If the Ghost is disconnected or there is a problem with connection, the menu will instead show that the Ghost is not connected.

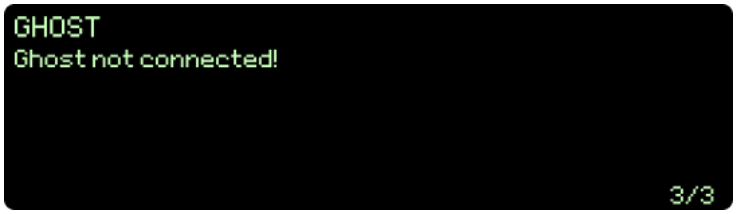

Fig 4.b.: TAC.Ctrl “Ghost not connected”

8.2. MENU / SUBMENU DETAILS

TAC.Ctrl welcome screen is presented when you power on the TAC.Ctrl.

Fig 5.a.: Welcome menu

Radio ON/OFF

- Turns on/off access to the Ghost

Sound ON/OFF

- Turns on/off the TAC.Ctrl speech functions

Display ON/OFF

- Turns on/off the TAC.Ctrl display (after 3 seconds)
- The screen will turn back on after one of the menu buttons is pressed

After confirming the presented options with enter button (M5), the current position overview of all the buttons / switches / gimbals will show on the screen (M6).

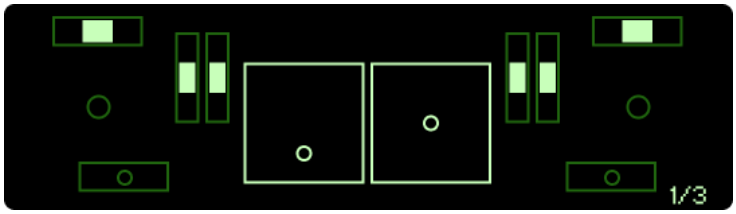

Fig 5.b.: Menu switch overview

Navigating to the right (M4), the TAC.Ctrl controller settings screen will be displayed.

Fig 5.c.: Main menu screen

Recalibrate gimbals

- Place the gimbal control sticks in the center, then follow the instructions on the screen to recalibrate gimbals (match the position of the dot on the screen with gimbal control sticks).

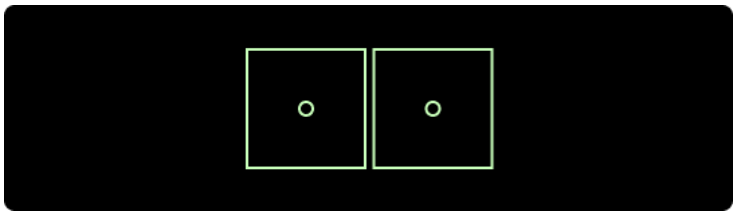

Fig 5.d.: Gimbal recalibration screen

Change voice pack

- Connecting the USB-C (22) cable to the TAC.Ctrl (which is primarily utilized for Orqa FPV.Skydive (*Berzerk Edition*) simulator) and choosing this option in the menu will allow you to upload additional voice packs

Audio volume

- Adjust the TAC.Ctrl sound volume
- Volume range can be set to be between 0-5

Audio language

- Change the TAC.Ctrl audio language
- Currently TAC.Ctrl supports ENG/UKR sound packs, but additional languages can be uploaded using the **Change voice pack** feature

Display

- Same feature as on the welcome screen

Radio

- Same feature as on the welcome screen

If the Ghost is connected, navigating to the right will display the current overview of the Ghost stats. These stats are the same as on the Ghost itself, and you can change them using the TAC.Ctrl interface.

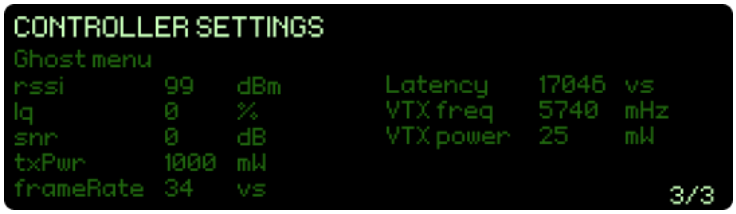

Fig 6.a.: Ghost menu - overview

To change the Ghost settings, navigate to the **Ghost menu.** All the standard Ghost options like Bind, Mode, Video Tx etc. will be displayed.

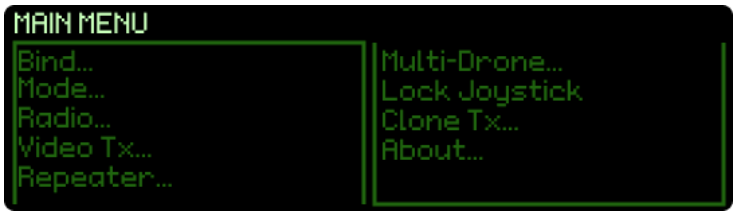

Fig 6.b.: Ghost main menu

Bind the Ghost with the receiver using the **Start Bind** function. **Rx Proto** allows you to choose between different protocols, including GHST and CRSF, while the **Rx ID** allows you to change the radio receiver ID for multi-drone operations.

Fig 6.c.: Ghost bind menu

Ghost supports various **RF modes** (Long Range, Normal, Race60 and Race150). View the mode details in the official Ghost documentation.

Fig 6.d.: Ghost mode menu

Radio select option allows you to change the bands during flight. This can also be done using the SL slider on the TAC.Ctrl.

Fig 6.e.: Ghost radio menu

Video Tx menu allows you to control the video transmitter on the remote UAV. Simply configure the desired Video Tx settings and click **Send**. Other settings in the **Video Tx** menu allow the behavior of the transmitter on failsafe (Rx Loss), and on powerup (before Tx/Rx have connected).

Fig 6.f.: Ghost video Tx menu

Repeater _____

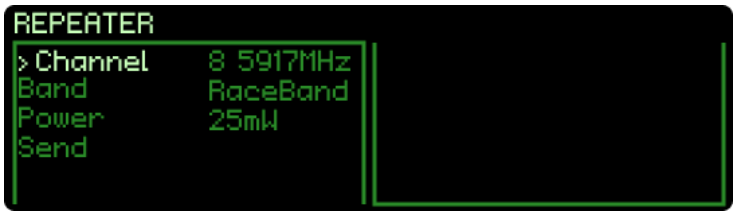

Fig 6.g.: Ghost repeater menu

Multi-Drone menu allows the pilot to decide which drone to control. **Grp Chn** defines the group of drones to control, while **Mod Chn** defines which drone within the group is active.

Fig 6.h.: Ghost multi-drone menu

Clone Tx allows a “slave” transmitter to be configured with the same transmitter ID as a “master” transmitter.

Fig 6.i.: Ghost clone Tx menu

About screen shows the current Tx and Rx firmware versions.

Fig 6.j.: Ghost about menu

Lock joystick feature is used for locking the physical joystick on the Ghost itself, so it can only be controlled from the TAC.Ctrl.

For more detailed information about the Ghost and its features, please refer to the official Ghost documentation which you can find here.

9. SPEECH FUNCTIONS

TAC.Ctrl is also equipped with a speaker (10) which allows you to hear selected switch functions.

Switch	Position	Speech
TL1	Up	Acro
	Center	Angle
	Down	Position Hold
TL2	Up	Pre-Arm Armed
	Center	Pre-Arm Disarmed
	Down	Pre-Arm Armed
TR1	Up	VTX Off
	Center	VTX On
	Down	VTX On High Power
TR2	Up	Payload Armed
	Center	Payload Disarmed
	Down	Payload Armed
RL	Up	Disarm
	Down	Arm
RR	Up	Camera 1
	Center	Camera 2
	Down	
SL	*Up (press)*	Band 2 (*or walk through 3...4*) Band up?
	Center (press)	
	Down (press)	Band 1 Band down?
SR	*Up (press)*	
	Center (press)	
	Down (press)	
BL	*Press*	Lock Target
BR	*Press*	Activate Payload

Table 9: TAC.Ctrl speech functions

Other audible notifications:

Low Battery

Telemetry Lost

Telemetry Recovered

Thermal Camera

10. CONNECTORS

Connector	Description
Lemo	Direct connection to FPV.Pro or FPV.One
RJ45	Connect only to IRONghost™ Matrix Ports (video + ghost + power) Does not support standard LAN cables.
HDMI	Input, fed directly to goggles
USB-C	For firmware updates, connect to HID gamepad (not for charging)
BNC	75ohm composite video port (PAL/NTSC)
Barrel	
XT-60	

Table 10: TAC.Ctrl connector description

11. BATTERY & CHARGING

TAC.Ctrl features a 6-cell, lithium-ion rechargeable battery (21700) with a 5500mAh (4000mAh min.) capacity.

TAC.Ctrl supports two separate ways of charging. The first way is a direct connection to the power source via Barrel connector port (27). Next to the Barrel connector port there is a LED (29) that will flash blue until the battery is fully charged. Once the LED turns off, the battery is fully charged.

The second way of charging is via XT-60 charging port (26) which can be used when there's no power outlet nearby. XT-60 can be connected to an external battery charger (e.g. IMAX B6, ISDT etc.).

WARNING: XT-60 Charging port (26) is directly connected to the battery. Input charge with CC/CV 25.2V/2A max.

You can check the status of the battery on the main menu screen (Fig 5.c.: Main menu screen).

Additionally, when the battery's low the TAC.Ctrl will let out a sound signal and notify you about the status (if sounds are enabled).

12. TECHNICAL SPECIFICATIONS

• Gimbals	Aluminum with 3D Hall Sensors
• Charging Voltage	XT60 port – 25.2V Barrel port – 28V
• Built-in Battery Type	6-cell Li-Ion (21700)
• Battery Capacity	5500mAh (4000mAh min.)
• Connectivity	Lemo, RJ45, USB-C, HDMI, Barrel, XT-60
• Maximum Charge Current	2A
• Charging Time (approx.)	2 hours
• Weight (with battery)	1.1kg
• Dimensions	_____

Table 12: TAC.Ctrl technical specifications

12.1. REVISION HISTORY

Rev. 1.0. – Release version of the TAC.Ctrl User manual

13. WARRANTY & SERVICES

Warranty Period

Exclusive Warranty - ORQA d.o.o., (Orqa) warranties that the Product purchased (the “TAC.Ctrl”) will be free from defects in materials and workmanship for a period of 2 years from the date of purchase by the Purchaser.

2-year Limited Warranty

Orqa reserves the right to change or modify this warranty without notice and disclaims all other warranties, express or implied.

(a) This warranty is not limited to the original Purchaser (“Purchaser”) and is transferable exclusively with Proof of purchase for all warranty claims.

(b) Limitations - ORQA MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCT. THE PURCHASER ACKNOWLEDGES THAT THEY ALONE HAVE DETERMINED THAT THE PRODUCT WILL SUITABLY MEET THE REQUIREMENTS OF THE PURCHASER’S INTENDED USE.

(c) Purchaser Remedy - Orqa’s sole obligation hereunder shall be that Orqa will, at its option, (i) repair or (ii) replace, any Product determined by Orqa to be defective. In the event of a defect, these are the Purchaser’s exclusive remedies. Orqa reserves the right to inspect any and all equipment involved in a warranty claim. Repair or replacement decisions are at the discretion of Orqa, or in agreement with the Purchaser, when possible. This warranty does not cover cosmetic damage or damage due to acts of God, accident, misuse, abuse, negligence, commercial use, or modification of or to any part of the Product. This warranty does not cover damage due to improper installation, operation, maintenance, or attempted repair by anyone other than Orqa. Return of any Product by Purchaser must be approved in writing by Orqa before shipment.

Damage Limits

ORQA SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCT, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY. Further, in no event shall the liability of Orqa exceed the individual price of the Product on which liability is asserted. As Orqa has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. If you as the Purchaser or user are not prepared to accept the liability associated with the use of this Product, you are advised to return this Product immediately in new and unused condition to the place of purchase. Law: These Terms are governed by Croatian law (without regard to conflict of law principals).

Warranty Services

Questions, Assistance, and Repairs

Your local hobby store and/or place of purchase cannot provide warranty support or repair. Once assembly, setup or use of the Product has been started, you must contact Orqa directly. This will enable Orqa to better answer your questions and service you in the event that you may need any assistance. For questions or assistance, please direct your email to support@orqafpv.com. You may also find information on our website at https://orqafpv.com/.

Inspection or Repairs

If this Product needs to be inspected or repaired, please contact Orqa support at support@orqafpv.com first in order to determine the best course of action. Shipping will be arranged in agreement with Orqa support agent via DHL by default (unless arranged otherwise in agreement with Orqa support agent and/or Orqa logistical team) which provides tracking and insurance for lost or damaged parcels, as Orqa is not responsible for merchandise until it arrives and is accepted at our facility. When arranging shipment with Orqa support agent, you will be asked to provide your complete name, street address, email address and phone number where you can be reached during business hours. All additional information and instructions required will be provided by the Orqa support agent.

Notice: Do not ship batteries to Orqa. If you have any issue with the battery, please contact the Orqa customer service.

Warranty Inspection and Repairs

To receive warranty service, you must provide your original sales receipt verifying the proof-of-purchase date. Provided warranty conditions have been met, your Product will be repaired or replaced free of charge. Repair or replacement decisions are at the sole discretion of Orqa, or in agreement with the Purchaser, when possible.

Non-Warranty Repairs

Should your repair not be covered by warranty, the repair will be completed after the Product has been assessed by Orqa and subsequent payment has been completed by the Purchaser, if required. Repair and payment cost estimates will be provided after the Product assessment by Orqa. In addition, you will be billed for return freight.