





USER MANUAL

VERSION 1.1 08/02/2024



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1. Product Description

The **ZERODRAG Nexus1** receiver is built upon the ExpressLRS project, an open-source RC link designed for various RC applications. ExpressLRS is dedicated to optimizing link performance in terms of speed, latency, and range, positioning itself as one of the fastest RC links with impressive long-range capabilities. The receiver, featured in the **ZERODRAG Nexus1**, surpasses the stability of signal transmission compared to old generation 2.4GHz links.

2. Specifications

The ZERODRAG Nexus1 Receiver boasts the following specifications:

- Weight:
 - ▶ Receiver: 1.2g
 - ▶ T-Antenna: 2.29g
- Dimension: 20mm*13mm
- Maximum Telemetry Power: 10 mW
- Frequency Bands: 2.4GHz ISM
- Input Voltage: 5V
- Antenna Connector: IPEX 1

3. In The Box

1 x Nexus1 receiver 1 x T-Antenna 3 x Heat shrink tube 4 x Silicone cable (Black, <mark>Red</mark>, <u>Blue, Green</u>)



4. Pinout



5. Wiring & Configuration

For connecting the ZERODRAG Nexus1 receiver to a flight controller using UART1 with the CRSF protocol:

- Connect Nexus1's TX to UART1 RX of the Flight Controller and Nexus1's RX to UART1 TX of the Flight Controller.
- Connect Nexus1 **5V** and **GND** pads to the 5V and ground pads of the flight controller.



5.1. Betaflight



1. In the Betaflight Configurator, assign **UART1** by enabling **Serial Rx** slider for receiver in the **Ports** tab, as shown below.

BETAFL Configurator: 10.9.0 Formware: 4.3.1 BTEL Target: WH/WHOT222 2023-11-30 @17:08:46 – Arming Dis	(6979436) (8979436) (8174327752) sabled				A A A A A A A A A A A A A A A A A A A	Dataflasht free 08	Update Firmware			
✓ Setup ✓ Ports							WIKI			
Configuration	Note: not all co Note: Do NOT o	mbinations are valid. When the flight contr disable MSP on the first serial port unless y	oller firmware detects this the serial ou know what you are doing. You m	port configuration will be rese ly have to reflash and erase yo						
	Identifier	Configuration/MSP	Serial Rx Te	emetry Output	Sensor Input	Pe	eripherals			
			Disab							
		○ 115200 ∨	C Disab							
		◯ 115200 ~	Disab							
			O Disab							
			Disab					\sim		
		115200 ~	Disab							
		115200 V	U Disto							
NI Video T		Configuration/MSP	Serial Rx		Telemetry Output		Sensor Input		Peripherals	
USB VCP		115200 ~		Dis	abled V AUTO V		Disabled ~ AUTO) ~	Disabled V AUTO V	
I Blackbe UART1		<u> </u>		Dis	abled V AUTO V		Disabled ~ AUT) ~	Disabled V AUTO V	
UART2		<u> </u>		Dis	abled V AUTO V		Disabled ~ AUT) ∨	Disabled V AUTO V	
UART3		<u> </u>		Dis	abled VAUTO V		Disabled ~ AUT) ~	Disabled V AUTO V	
Port utilization: D: 0 % U: 0 % Pac	cket error: 0 I2C	error: 7 Cycle Time: 123 CPU Loa	id: 25 %		Configurator: 10.9.0 (6979	43b) , Firmware: 4.3.1 BTFL ,	Save and Reboot Target: WH/WHF722(STM32F7X2)			

2. In the **Receiver** tab, select **Serial (via UART)** in **Receiver Mode** and choose **CRSF** in **Serial Receiver Provider** from the dropdown, as shown below.

BETAFL	IGHT	
		Shart.co
	Always check that your Fallsafe is working properly! The settings are in the Fal	taufe tauk, which requires Expert Mode.
	One the latest is formulated One the hardware ADC filter in the Transmitter if using OpenTx or EdgeTx.	
	Basic Setup: Configure the 'Receiver' settings correctly. Choose the correct 'Channel to ~1000 to ~2009, and set the midpoint to 1500. For more information, read the do	Mag Te by an adds. Check that the Kok, Pich and other bair graphs move correctly. Adjust the channel endpoint or range values in the transmitter contenderation.
		Receiver
		Serial (via LART) Receiver Mode
📩 Receiver		The ILIES for the available much be not in Series by Can the Barrer table
2 Modes		select the correct data format from the drop-down, balax
		CREar V Serial Receive Provider
		Telemetry
	D-11/21	TELEMETRY Telementy autout
	Pitch (E) 1500	
	Yaw [R] 1500	RSSI (Sienal Streneth)
	AUX 1 1500	Receiver
	AUX 2 1500	
	AUX 3 1900 AUX 4 1500	
	AUX 5 1500	Receiver Mode
	AUX 6 1500	
	AUX 8 1500	
	AUX 9 1500	
	AUX 10 1500	• The UART for the receiver must be set to 'Serial Rx' (in the <i>Port</i> s tab)
		Solort the correct data format from the drain down below.
Port utilization: D: 29 % U: 3 % P	acket error: 0 I2C error: 7 Cycle Time: 124 CPU Load: 26 %	- Select the confect data format normat
		CRSE V Serial Receiver Provider

Save changes and reboot the flight controller by selecting the **Save And Reboot** on the bottom right corner.

Note: These steps, using UART1 as an example, provide a concise guide for integrating ZERODRAG Nexus1 with Betaflight firmware. Depending on the free UARTs available on your flight controller, select the appropriate UART as per your wiring with Nexus1 Receiver.



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5.2. INAV



1. In the INAV Configurator, assign **UART1** by enabling **Serial Rx** slider for receiver in the **Ports** tab, as shown below.

			INAV	Configurator				
					Flow Sonar Speed	No dataflash chip found Battery pr	ofile 1 🗢 Disconnect	\$P
2023-12-05 @ 15:12:56 PWM outp	put is disabled.	Motors and servos will r	ot work. Use <u>Outputs</u> tab to enable!				Show Loj	5
Setup	Ports						DOCUMENTATION	
Calibration	Note: not all Note: Do NO	l combinations are valid. Whe OT disable MSP on the first se	en the flight controller firmware detects this the sei rial port unless you know what you are doing. You	rial port configuration will be res may have to reflash and erase y	et. our configuration if you do.			
€ Ports	Identifier	Data	Telemetry	RX	Sensors	Peripherals		
Configuration	USB VCP	MSP 115200	✓ Disabled ✓ AUTO ✓	Serial RX	Disabled v 115200 v	Disabled	~ 115200 ~	
 Failsafe 	UART1	MSP 115200	✓ Disabled ✓ AUTO ✓	Serial RX	Disabled V 115200 V	Disabled	✓ 115200 ✓	
PID tuning	UART2	MSP 115200	✓ Disabled ✓ AUTO ✓	Serial RX	Disabled V 115200 V	Disabled	✓ 115200 ✓	
Advanced Tuning	UART3	MSP 115200	✓ Disabled ✓ AUTO ✓	Serial RX	Disabled V 115200 V	Disabled	✓ 115200 ✓	
Programming	UART4	MSP 115200	✓ Disabled ✓ AUTO ✓	Serial RX	Disabled V 115200 V	Disabled	~ 115200 ~	
Receiver	UART5	MSP 115200	✓ Disabled ✓ AUTO ✓	Serial RX	Disabled V 115200 V	Disabled	✓ 115200 ✓	
8 Modes								
UART1	MSP 11	5200 ~	Disabled V AUTO V	Serial R	K Disabled v 11	5200 ~	Disabled	✓ 115200 ×
s GPS								
Magnetometer								
Mission Control								
OSD				•				
LED Strip								
- Sensors								
Tethered Logging								
Blackbox							Save and Reboot	
l cu				- Luna - Lunar				



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2. In the **Configuration** tab, slide the **Telemetry Output** slider to allow telemetry data to be received on your radio.

• • •		NAV Configurator						
CONFIGURATOR 61.0 FC FIRMWARE 6.1.1 (MATEKF405				Ne dezilisiń chip found Profile 1 ¢ Battery profile 1 ¢	Disconnect			
Setup Calibration	Roll & Pitch board orientation is available only in the CLI. Do not use it to for the level flight! Use Fixed Wing Level Trim on the PID tuning tab unde instead (w_level_pitch_trim).	trim the airplane r Mechanics	Battery Settings	Number of cells (0 = auto)	©			
Mixer Outputs Ke Ports	0.0 S Yaw Degrees		4.25 Maximum cell voltage for cell count detection 3.3 Minimum Cell Voltage					
Configuration	Other Features		4.2 3.5	Maximum Cell Voltage Warning Cell Voltage				
🗇 Failsafe	Stop motors on low throttle		mAh ~	Battery Capacity Unit				
ക PID tuning	GPS for navigation and telemetry	9	0	Capacity				
Programming	Telemetry output	0		Critical Capacity (remaining %)				
d Receiver	Reversible motors mode (for use with reversible ESCs)	0						
Modes	Analog RSSI input Multi-color RGB LED strip support	0						
Agustinents	OLED Screen Display	0						
Ø Magnetometer	Blackbox flight data recorder	0						
Mission Control	Enable motor and servo output	0						
OSD	CPU based SPI							
- Sensors	Permanently enable AIRMODE							
🖼 Tethered Logging	Permanently enable Launch Mode for Fixed Wing							
I Blackbox					Save and Reboot			
CLI		and at that sound a feed of	C Dura mala OV					

3. In the **Receiver** tab, select **SERIAL** in **Receiver Type** and choose **CRSF** in **Serial Receiver Provider** from the dropdown, as shown below.

			No distatistich No distatistich No distatistich Image: Construction of the construction of t	¢t _o
2023-12-05 @ 15:12:56 PWM outj	out is disabled. Motors and servos will not work. U	se <u>Outputs</u> tab to enable	ite! Show	Log
✓ Setup	Receiver		DOCUMENTATI	ON
the ballions	Please read receiver chapter of the documentation. C	anfigura carial part (if requir	und), receiver mode (caris) (apm (num), acceiver (for caris) receiver), biod receiver, cat channel man, configure channel and aciety (cance on TV caris	hat
	all channels go from ~1000 to ~2000. Set midpoint (de	fault 1500), trim channels to	to 1500, configure stick deadband, verify behaviour when TX is off or out of range. Make sure that the channel values all increase when you push the adverse million is the TX.	è
outputs	IMPORTANT: Before flying read failsafe chapter of doc	umentation and configure fa	fallsafe.	
🖌 Ports				_
Configuration	Channel Map	RS	SSI Channel Receiver Mode	
💎 Failsafe	AETR	↓ L	SERIAL V Receiver type	
우 DID tuning	Roll [A]	1500		
	Pitch [E]	1500	Note: Remember to configure a Serial Port (via Ports tab) for the serial receiver	
සු Advanced Tuning	Yaw [R]	1500	CRSF V Serial Receiver Provider	
🏟 Programming	Throttle [T]	885	OFF Serial Port Inverted (comparing to protocol default)	
📩 Receiver	CH 6	1500	Contained and the second secon	-1 λ
Modes	CH 7	1500	AUTO V Serial receiver hait-ouplex	
Initial States	CH 8	1500	DC Granabling	- \
†∔† Adjustments	CH 9	1500	RC Smoothing	
🔉 GPS	CH 10	1500	Lise automatic PC smoothing	
(3) Magnetometer	CH 11	1500	Receiver Mode	
O Mission Control	CH 13	1500		
V Mission Control	CH 14	1500	SERIAI Receiver type	
🚥 OSD	CH 15	15 <mark>00</mark>		
🗍 LED Strip	CH 16	1500	Notes Descendents and Common Control Dest (to Desta to b) Control and the sector	
	CH 17	1500	Note: Remember to configure a Serial Port (via Ports tab) for the serial receiver	
		1300	CDCC Serial Receiver Provider	
E lethered Logging			CRSF V Scharkeceiver Howder	
: Blackbox			OFF Serial Port Inverted (comparing to protocol default)	
Packet error: 0 12C error: 0 Cy	rcle Time: 502 CPU Load: 8% MSP version: 2 1	MSP load: 0.4 MSP rou	AUTO Serial receiver half-duplex	



5.3. PX4 / ARDUPILOT

1. Wiring Diagram for **Cube**



 In the Vehicle Setup tab, select Parameters then choose SERIAL and assign RCIN to SERIAL 1_PROTOCOL, as shown below.

QGroundControl					-	o X
	Vehicle Setup					
Summary	Search:	Clear				Tools
	MSP	SERIALO_BAUD	115200	Serial0 baud rate		
Firmware	CA.	SERIALO_PROTOCOL	MAVLink2	Console protocol selection		
Frame	050	SERIAL1_BAUD	57600	Telem1 Baud Rate		
Radio	PILOT	SERIAL1_PROTOCOL	RCIN	Telem1 protocol selection		
	PRX	SERIAL2_BAUD	115200	Telemetry 2 Baud Rate		
Flight Modes	PSC	SERIAL2_PROTOCOL	SToRM32 Gimbal Se	ial Telemetry 2 protocol selection		
	RALLY	SERIAL3_BAUD	38400	Serial 3 (GPS) Baud Rate		
	RC		38400	Senal & Baud Pare		
Power	RELAY	SERIAL4_PROTOCOL	GPS	Serial4 protocol selection		
Motors	RNGEND	SERIALS_BAUD	57600	Serial 5 Baud Rate		
Safety	RNGENDA	SERIAL5_PROTOCOL		SerialS protocol selection		
	RSS					
Tuning	871					
Parameters	SEDIAL					
	SERIAL					
	35010					
	SID					
	SPRAY					
	SRIL					
	STAT					
	THROW					
	TUNE					
	WINCH					
	WPNAV					
	WP					
	Standard					
	Advanced	-				
	Other 7	1				





6. Binding

You can bind the Nexus1 receiver with your radio controller using two methods, the Bind Phrase method and the Conventional method. In Bind Phrase method your receiver and radio controller will use a unique bind phrase to exclusively establish a connection between them. A single Bind Phrase can be used to connect multiple receivers to a single radio controller. This ensures a safe and reliable method for connecting the receiver and the radio controller.

In the Conventional method binding is performed by finding the first active radio controller. If multiple radios in the vicinity of the receiver are in binding mode it can lead to a random binding with one of them.

6.1. Bind Phrase Method

- 1. From Device Category dropdown, select ZeroDrag 2.4 GHz
- 2. From Device dropdown, select NexusOne 2.4GHz RX
- 3. Select **BINDING_PHRASE** and enter your custom binding phrase.
- 4. Flash the receiver by clicking the flash button at the bottom of the page.

Note: Ensure that you enter the same Custom binding phrase as on your transmitter.

•••							
		ExpressLRS Configurator 🗤 🗤	=	a f	0	Ċ	
× 1		Firmware version					
• •	Device category ZeroDrag 2.4	OFFICIAL RELEASES GIT BRANCH GIT COMMIT LOCAL GIT PULL REQUEST					•
?	ZeroDrag Ne	xusONE 2.4GHz RX					-
		Contractor					
		ZeroDrag 2.4 GHz Device ZeroDrag NexusONE 2.4GHz RX				• •	
		Flashing Method BetaflightPassthrough UART UART WiFi					
		Device options RESET					



£

	ExpressLRS Configurator	
	Cevice options RESET	
٩,		
	Regulatory domains Performance options	
≔	REGULATORY_DOMAIN_EU_CE_2400 ? CLOCK_ON_FIRST_CONNECTION ?	
	REGULATORY_DOMAIN_ISM_2400 ONetwork	
\$	Binding phrase setup	
?		
	Custom binding phrase	h
	Compatibility options	
	BINDING_PHRASE ?	
	Manual serial device selection	
	Flashing Options	

6.2. Conventional Method

The binding process for the Nexus1 ELRS 2.4GHz receiver involves the following steps:

- Power on and off the receiver three times consecutively within a 1-second interval.
- Observe the receiver's LED, which should exhibit a double flashing pattern. This signals that the receiver has entered the binding mode.
- Initiate the binding status on the transmitter module or the radio transmitter. Once the LED status on the receiver changes to a solid light, the binding process is successful.

This concise set of instructions ensures a seamless binding procedure for the Nexus1 ELRS 2.4GHz receiver.



7. Binding Verification

You can verify the Nexus1 receiver's communication link in the configurator software you are using. As an example, the real-time input preview from the Betaflight configurator is shown below. When you move the joysticks on the radio controller you should see the data indicators changing in response.





8. Troubleshooting

Receivers with a single color LED communicate their status as follows:

LED Indication	Status
Slow blink 500ms on/off	Waiting for connection from transmitter
Fast blinking 25ms on/off	WiFi mode enabled
Medium speed blink 100ms on/off	Radio chip not detected
Double blink then pause	Binding mode enabled
Triple blink then pause	Connected to transmitter but mismatched model-match configuration
Solid on	Connected to a transmitter, or bootloader mode enabled

For LED status indication animation, you can visit the <u>Betaflight LED Status page</u> in the documentation.

Important: When using the receiver, ensure that the SBUS connection from DJI (Air Units) is disconnected. Failure to do so may result in the RX (receiver) entering boot mode unexpectedly. Please double-check this connection before use to prevent any operational issues.

9. Contact

- Website: <u>https://zerodrag.in/</u>
- Instagram: https://www.instagram.com/zerodrag.in/
- LinkedIn: <u>https://www.linkedin.com/company/zerodrag/</u>
- WhatsApp: <u>https://wa.me/9821734544</u>

10. Reference

- ExpressLRS GitHub page: <u>https://github.com/ExpressLRS</u>
- Official ExpressLRS website: <u>https://www.expresslrs.org/</u>.

