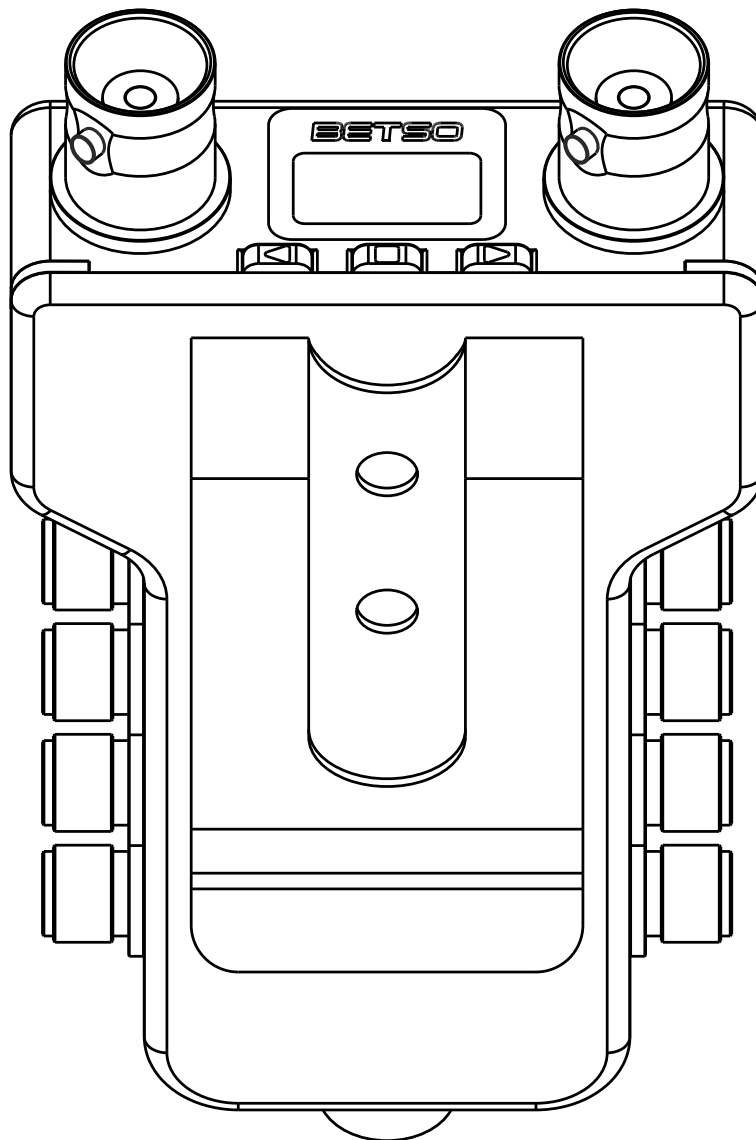


BETSO

RF OCTOPUS

The world's most versatile RF splitter, combiner, and diagnostic tool



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Used symbols



Indicates text that has only informative character. If you overlook this information, it can't result in product damage by it's mishandling.



Indicates text that has important instruction character. If you overlook this information, it may result in product damage not covered by warranty.

Thank you for purchasing the BETSO product!

Please carefully read this user manual to ensure proper use of your new BETSO product. Following these instructions will help you prevent potential damage and fully explore all the available features designed to maximize the product's potential.

For the latest information about our products BETSO please contact your local distributor or visit our website <https://www.betso.eu>.

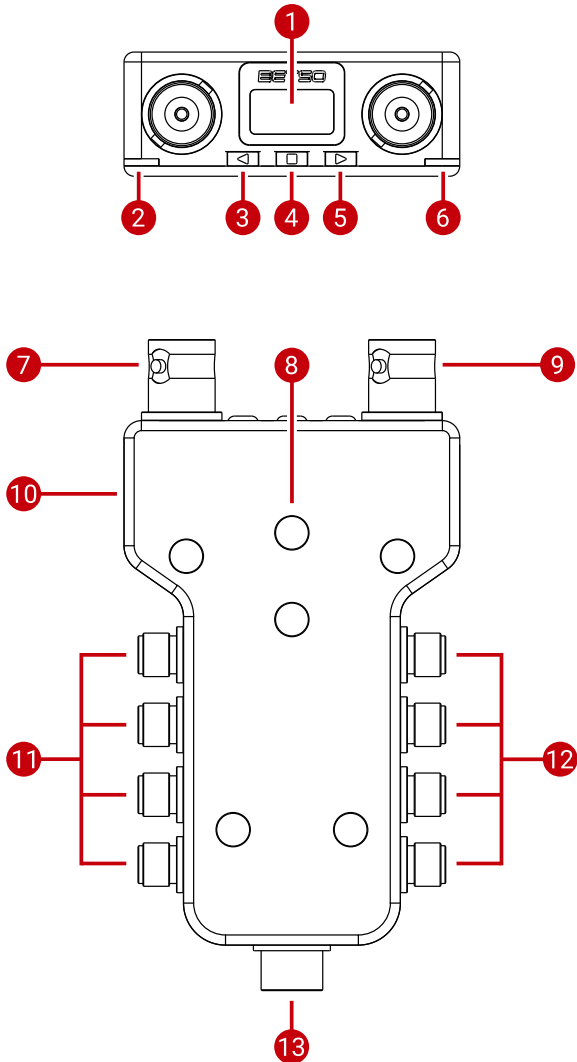
1. Product description

The RF OCTOPUS is the smallest and world's most versatile RF splitter, combiner, and diagnostic tool ever made. The device supports multiple RF splitter configurations and thanks to user-selectable low-pass filters (700 MHz, 960 MHz, or 1260 MHz) and individually switchable power for active antennas, the RF OCTOPUS is perfectly suited for worldwide applications. A sunlight-readable OLED display and two bright white LEDs together with overload protection and failure signalization ensure seamless operation in any environment. Furthermore, RF OCTOPUS has a smart diagnostic capabilities thanks to its built-in cable attenuation measurement tool, making it a versatile device for any situation. Additionally, the RF OCTOPUS can be equipped with a steel belt clip (included) that can be attached to the top or bottom of the chassis for secure placement in your sound bag.

2. Top features

- **Multiple RF configurations:**
 - **splitter 2:8** (diversity: 1 input → 4 outputs),
 - **splitter 1:8** (1 input → 8 outputs),
 - **combiner-splitter 2:8** (SUM two inputs → 8 outputs).
- **User-selectable low-pass filters** (470 MHz – 700 MHz, 960 MHz, or 1260 MHz) directly accessible via the intuitive menu.
- **User-adjustable gain:** -10 to +10 db.
- **Sunlight-readable OLED display** for straightforward operation and more.
- **Two bright white LEDs** provide quick visual indication.
- **Individually switchable power output** for active antennas with **overload protection**
- **Built-in cable attenuation diagnostic tool** based on selected frequency (500-950 MHz).
- **Automatic power-on function** when the device is connected to a power source and was powered off by power supply disconnection.
- **Integrated USB-C** port provides easy future firmware updates.
- **Removable belt clip** allows secure attachment in your sound bag.

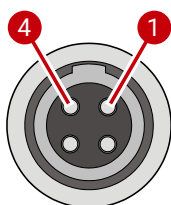
3. Control elements



1. OLED display protected by gorilla glass panel
2. Status LED of **RF ch. A** input
3. Button **LEFT**
4. Button **SET**
5. Button **RIGHT**
6. Status LED of **RF ch. B** input
7. BNC input connector of **RF ch. A**
8. A pair of mounting holes for belt clip attachment
9. BNC input connector of **RF ch. B**
10. USB connector
11. SMA outputs connectors of **RF ch. B**
12. SMA outputs connectors of **RF ch. A**
13. Input connector Hirose 4-pin for external power source connection

4. Power supply

Power the device using an external 6-18 VDC power supply connected via a special cable to the Hirose 4-pin input connector, which is wired as shown in the figure below.



1. GND
4. 6-18V DC



Warning: Never connect a power adapter with the voltage level higher than 18V. This could lead to serious damage to the device.



Warning: Never connect external power with wrong polarity. It would cause device failure.



When you connect external power and the device cannot be switched on, remove it as soon as possible and check polarity of external power source.

5. Turning on

Turning device ON long press of **SET** button,

Turning device OFF long press of **SET** button until “Off” widget is highlighted / or by disconnecting from the power supply.



When RF OCTOPUS is turned off by just disconnecting from power supply, it will turn on automatically after power supply re-connection.

6. Menu control

Enter the menu long press of **SET** button until “Menu” widget is highlighted

Exit the menu long press of **SET** button in main menu or EXIT at the end of menu

Enter the submenu short press of **SET** button

Exit the submenu long press of **SET** button or EXIT at the end of submenu

Move left short press of **LEFT** button

Move right short press of **RIGHT** button

Enter the setting short press of **SET** button

Change setting short press of **LEFT** / **RIGHT** button

Confirm the setting short or long press of **SET** button



All settings are saved immediately after confirmation.

7. Settings

Menu control is described in previous chapter 6 Menu control.

7.1 Optional DC powering for connected antennas

The outputs are overload protected (maximum output current is 250 mA) and the voltage level for the active antenna powering is the same as the input voltage level of the power supply (plugged in the Hirose 4-pin connector).



The outputs are overload protected (maximum output current is 250 mA). When the output is overloaded or shorted, the corresponding input LED starts flashing rapidly.

7.1.1 Ant. Type A – Antenna type A

Menu / Ant. Type A

This functions sets optional DC powering for connected antenna to the input A.

Pas. (DC off)	passive antenna connected, DC powering is turned off,
Act. (DC on)	active antenna connected, DC powering is turned on.

7.1.2 Ant. Type B – Antenna type B

Menu / Ant. Type B

This functions sets optional DC powering for connected antenna to the input B.

Pas. (DC off)	passive antenna connected, DC powering is turned off,
Act. (DC on)	active antenna connected, DC powering is turned on.

7.2 RF filter – low pass filter selection

Menu / RF filter

This function sets used low pass filter for both channels simultaneously.

470 – 700 M	low pass set to 700 MHz,
470 – 960 M	low pass set to 960 MHz,
470 – 1260 M	low pass set to 1260 MHz.

7.3 RF mode – signal path selection

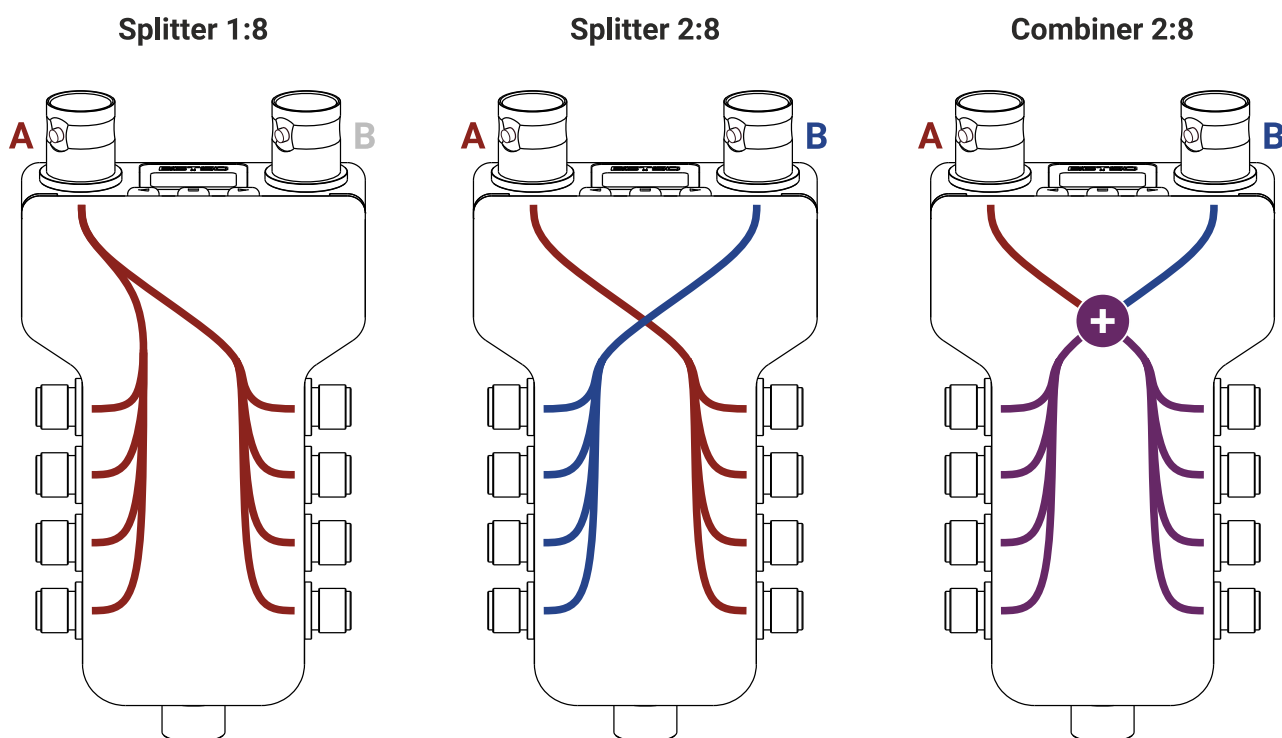
Menu / RF mode

This function sets signal path selection and operational mode of RF OCTOPUS.

Splitter 1:8 Splits input A to all eight outputs,

Splitter 2:8 Splits input A to 4 outputs A and input B to 4 outputs B,

Combiner 2:8 Combines input A and input B into one signal which is splitted to all eight outputs.





In Combiner 2:8 mode, the user can enable or disable the RF signal for Channel A or Channel B by pressing and holding the LEFT or RIGHT button, respectively. This allows for quick activation or deactivation of specific zones.

7.4 RF gain – overall gain selection

Menu / RF gain

This function sets overall gain of RF OCTOPUS.

- **10 to +10 dB** overall gain of RF OCTOPUS in **Splitter 2:8** mode set in 1 dB steps,
- **10 to +4 dB** overall gain of RF OCTOPUS in **Splitter 1:8** or **Comb. 2:8** mode set in 1 dB steps.



If gain greater than +4 dB is set and RF mode is changed from Splitter 2:8 mode to Splitter 1:8 or Comb. 2:8 mode, gain will be automatically lowered to +4 dB.

7.5 Cable loss – measurement

Menu / Cable loss

This is a special function accessible via the menu that measures the cable loss of the connected cable between input A and input B. The cable loss is measured on specified frequency, which can be selected as is described in chapter 7.6.1 Meas. freq. – measurement frequency.

- 0 – 35 dB** the range of cable loss is 0 – 35 dB.



This measurement mode can be exited by press of any button confirmed by SET button.



Warning: In the cable loss measurement mode, connect only coax cable between input A and input B. **Never connect antennas or other devices to input A and input B in this mode!**

7.6 System

This section contains system information and settings.

7.6.1 Meas. freq. – measurement frequency

Menu / System / Meas. freq.

This function sets measurement frequency for cable loss function.

500 to 950 MHz measurement frequency in range 500 – 950 MHz set in steps of 50 MHz.

7.6.2 SN – serial number

Menu / System / SN

Displays the serial number of the RF OCTOPUS.

7.6.3 HW – hardware version

Menu / System / HW

Displays the hardware version of the RF OCTOPUS.

7.6.4 FW – firmware version

Menu / System / FW

Displays the firmware version of the RF OCTOPUS.

7.6.5 Exit

Menu / System / Exit Exits system submenu.

7.7 Exit

Menu / Exit Exits menu.

8. Firmware updating

Thanks to the USB service connector, the RF OCTOPUS is ready for easy firmware updates when a new version is released. This ensures that you always get all the latest features and maximize the potential of the device. We listen to our customers' needs, so stay tuned.

Updating process:

- Visit <https://www.betso.eu/support> and download the latest firmware.
- Extract the zip file containing the latest firmware file to your computer.
- Make sure power is not connected to the main HRS-4pin connector.
- Use a pin to remove the USB connector cap.
- Press and hold the **SET** button before connecting the RF OCTOPUS to a computer.
- After connecting the RF OCTOPUS to the computer, it appears as a USB flash drive.
- Copy the file (with the *.uf2 extension) of the latest firmware to RF OCTOPUS.
- Wait for the firmware update to be completed. After the firmware update is successfully completed, the device will automatically reboot and power on.
- Disconnect the USB cable and put the connector cap back on.



Warning: Use only the USB connector during the entire update process. The power supply must not be connected to the main HRS-4pin connector!



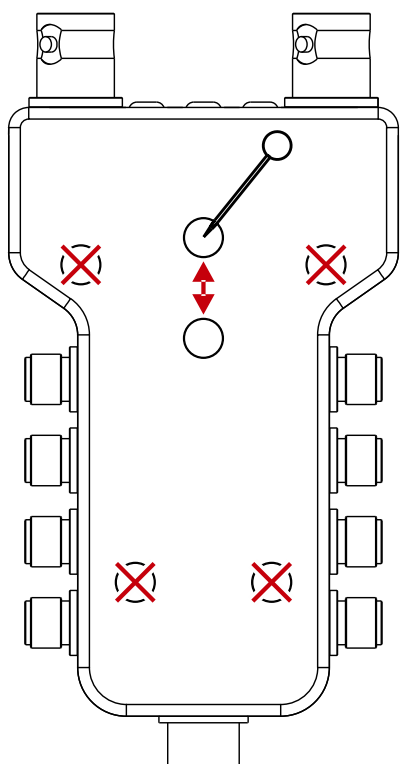
Warning: Never disconnect the RF OCTOPUS from the computer during a firmware updating process. Interrupting the updating process may damage the device.



Warning: Update only with the official firmware. Use of unofficial firmware will result in loss of warranty.

9. Belt clip

In the box there is an accessory pack containing a belt clip with M3 screws and spare caps.



Installation steps:

- Remove the belt clip from the paper.
- Prepare a sharp pin.
- Using the pin, pierce the cap in the middle and remove the pair of center caps on the desired side where the clip will be mounted.
- Use a TORX T9 screwdriver to tighten the two M3 screws to secure the belt clip.

Removal steps:

- Use a TORX T9 screwdriver to loosen the two M3 screws.
- Remove the belt clip from RF OCTOPUS.
- Use the spare caps to cover the unused M3 threads.



Warning: Double check which caps need to be removed. Remove only the center pair, under which are mounting threads for the belt clip. The outermost four caps cover the assembly screws – do not remove these caps nor the screws!



Warning: Maximum tightening torque is 1Nm (0.75 lbf·ft).



Two spare black circle caps are included in the accessory pack. Keep them for later use.

10. Recommended accessories

For the latest information about our products BETSO please contact your local distributor or visit our website <https://www.betso.eu>.

11. Troubleshooting

It is not possible to turn on RF OCTOPUS

Ensure that a power source with a voltage level of 6–18V DC is connected to the power input connector.



Warning: Never connect power with voltage level greater than 18V DC.

Active antenna is not powered ON by RF OCTOPUS

Please check, that corresponding input Ant. type A or B is set to Act. (DC on).

Please check, that corresponding LED diode A or B is turned ON for input set to Act. (DC on).

If LED diode A or B is rapidly flashing, it means, there is a shortcut on corresponding input – cable to antenna or antenna itself is faulty.

12. Safety instruction



Warning: Do not open the device under any circumstances! All repairs must be carried out by an authorized service center. In case of opening the device out of authorized service center, you automatically lose the warranty of the device.



Warning: Do not use the electrical device in the places with high humidity, especially take care to protect the device against direct contact with water.



Warning: To clean the device, disconnect it from the power source and use a dampened piece of cloth. Never use any chemical solvents!

13. Technical specifications

Frequency range	470-1260 MHz (with in menu user-selectable low pass filters 700 MHz, 960 MHz or 1260 MHz)
In-built low pass selectable filters	700 MHz (\Rightarrow 470-700 MHz), 960 MHz (\Rightarrow 470-960 MHz), 1260 MHz (\Rightarrow 470-1260 MHz)
Operation modes	Splitter 2:8 (diversity 1x input \rightarrow 4x output) Splitter 1:8 (1x input \rightarrow 8x output) Combiner-Splitter 1:8 (SUM of two inputs \rightarrow 8x output)
Overall gain	-10 to +10 dB, user-adjustable
Input and output impedance	50 Ohm
OIP3	> +40 dBm
Output port-port isolation	> 21 dB (typ.)
Noise figure of LNA	< 0.8 dB
Input connectors	High quality BNC sockets
Output connectors sockets	High quality SMA sockets
Input powering connector	HRS compatible 4-pin
Operating voltage	6-18V DC
Current consumption	< 100mA @12 V DC
Active antenna powering	individually switchable, overload protected and monitored
Mechanic construction	CNC milled, anodized aluminium alloy
Dimensions (of the case)	75.0 x 48.0 x 17.8 mm (2.95" x 1.89" x 0.7")
Weight	approx. 110 g

Cable loss attenuation measurement

Measured attenuation	from 0 dB to 35 dB
Frequency of measurement	500 – 950 MHz (user-selectable in 50 MHz steps)
Maximum coax cable length	up to 200 m *

* Depends on the type of cable and its attenuation.

14. EC Declaration of conformity



BETSO ELECTRONICS s.r.o.

Ke Drackam 1603, 156 00 Praha 5 – Zbraslav, Czech Republic

Reg. Number: 28955706

declares that this device

BETSO RF OCTOPUS

specification: The world's most versatile RF splitter, combiner and diagnostic tool

conform to the essential requirements of the following European Directives and their associated norms:

Directive	Applicable Standards	Description
EMC	EN 55032:2015 EN55035:2017	Electromagnetic compatibility of multimedia equipment
Safety	EN 62368-1 2014	Audio/video, information and communication technology equipment – Part 1: Safety requirements
RoHS	EN IEC 63000:2018	Technical documentation for assessment of electrical and electronic products with respect to the restriction of hazardous substances

Conformity assessed via Annex III. using a Technical Construction and Results of measurements.

January 2025

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