MRK16 User Manual

16 Channels

Ultra-Wideband

Rack unit

Rev.01 (ref. FW 1.4.0)

Date: 16th July 2024

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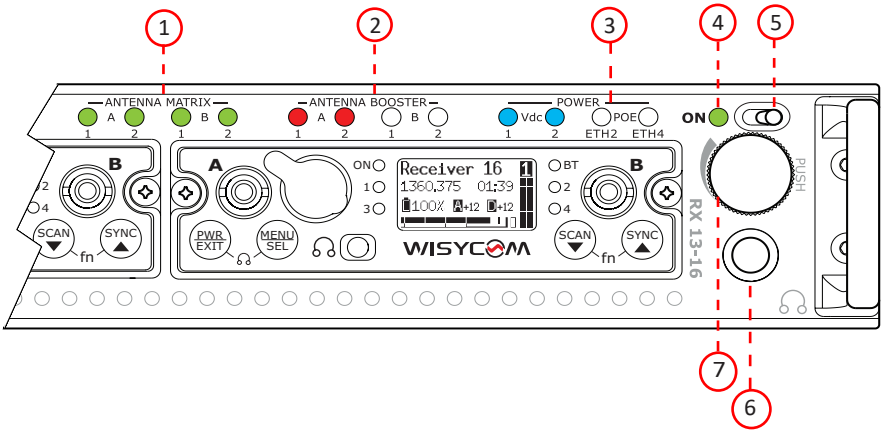

1. Antenna Matrix Status LED
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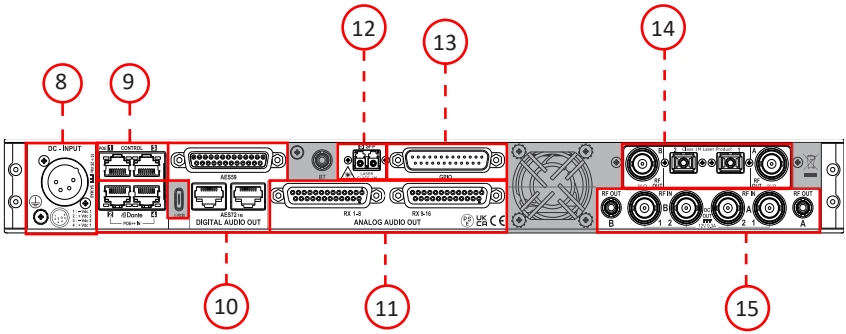
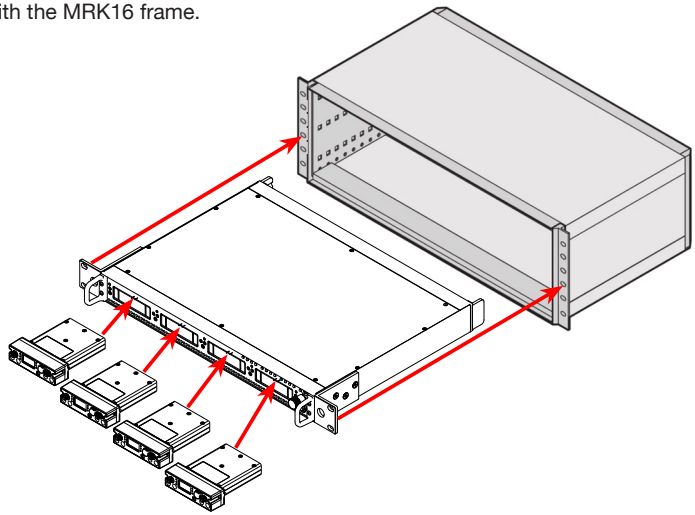
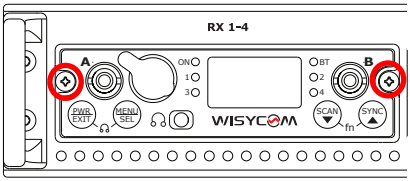


MOUNTING INSTRUCTIONS

The MRK16 is designed to fit into a standard 19” audio rack. Ensure the device is properly secured to the rack frame before operating it, allowing unobstructed space for rear ventilation. To insert the MCR54, push the receiver through the slot in the door until the top section is flush with the MRK16 frame.



Once the receivers are properly inserted, hand-tighten the two screws on the sides of the receivers into the dedicated holes in the MRK16 chassis. This will secure the MCR54 to the rack frame and prevent possible disconnections, which could cause the MCR54 to switch off and result in a loss of RF signal and audio. It is recommended to power off the MRK16 when inserting or removing the MCR54.



POWERING UP

To switch on the MRK16, connect the PSP15V4A0-X power supply provided with the rack to the DC-INPUT connector. The corresponding power LED on the front panel will illuminate.

- If the LED is blue, the power supply is connected and in use.
- If the LED is green, the PSU is detected but not in use.

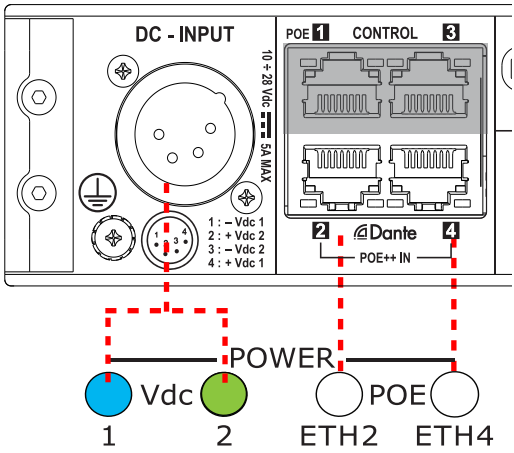
The MRK16 supports up to four different power supply sources:

- Two for the DC-INPUT connector, using a split 4-pin XLR cable (part number CDC06), allowing connection to two independent power supplies: 10÷ 28 Vdc, 5A max

1: -Vdc1
2: +Vdc2
3: -Vdc2
4:+Vdc1

CDC06

- Two Power over Ethernet (PoE) connections (optional) that can be made through Ethernet ports 2 and 4 on the rear panel (ETH2 and ETH4).



(*)IEEE 802.3bt Type3 Class6 (51W minimun)

MENU AND CONFIGURATION

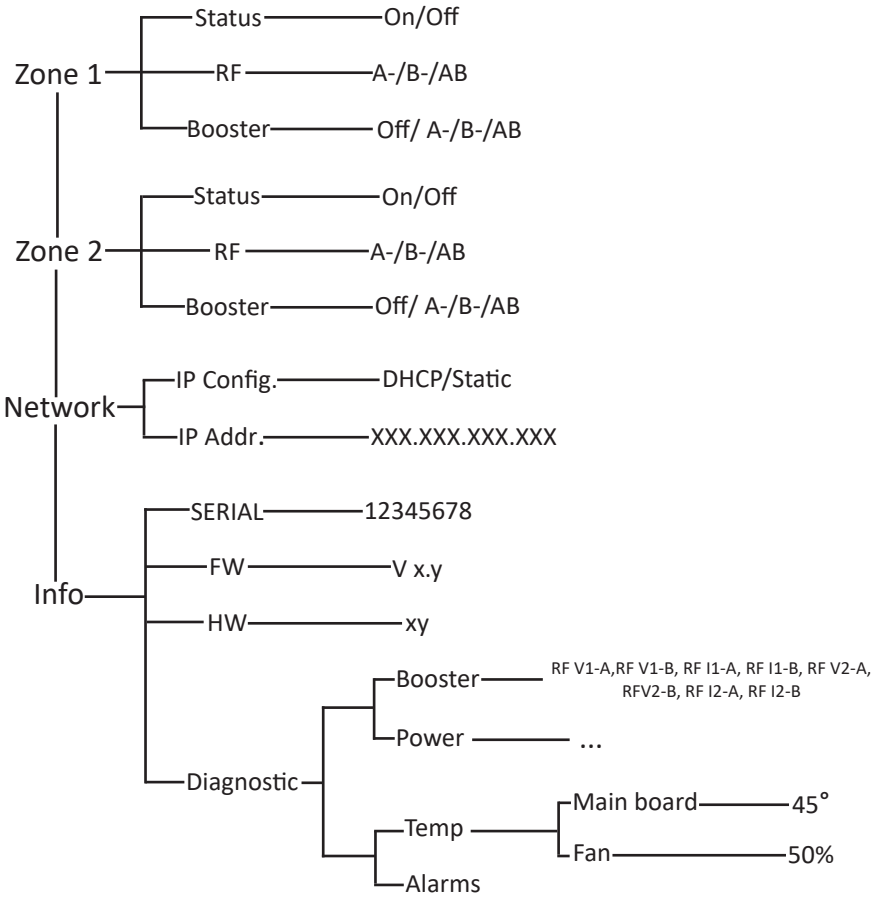
Front panel audio monitoring

Press the headphone encoder once to enter the RX audio monitor selection mode. In this mode, the monitored receiver will start blinking on the MCR54 display. Scroll left or right to change the monitored receiver, or press the encoder again to exit the monitor selection mode. Once you exit this mode, you can use the headphone encoder to adjust the headphone output volume.

Main menu

To enter the MRK16 main menu, press and hold the headphone encoder for two seconds. The MRK16 menu will appear on the display of the furthest receiver to the right. If no receivers are inserted, you cannot access the MRK16 menu unless the device is connected to the Wisycom Manager.

Once inside the menu, use the same knob to scroll through the menu. Select and edit parameters by pressing the encoder to confirm your choices.



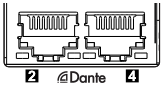
AUDIO OUTPUT

The following audio outputs are available simultaneously:
1- Analogue
2- Digital (only one between AES59 or AES72)
3- Dante

Ethernet ports

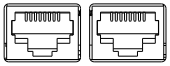
DANTE

These digital ports output audio through a CAT5 connector, specifically from ports 2 and 4. Using the Dante Control software, you can change the word clock from 48kHz to 96kHz and configure all four ports to enable, for example, the Dante output on any port (1, 2, 3, 4, or 5).



AES72

These digital ports output audio through a CAT5 connector. The sampling rate of the digital audio output is fixed at 48kHz.



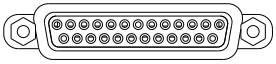
DIGITAL AUDIO OUT

D-subminiature

D-subminiature connectors are used to carry balanced analog or digital audio on many multi-channel professional audio equipment, where the use of XLR connectors is impractical due to space constraints.

AES59 Out

These digital ports output audio through a DB25 pin connector (Tascam standard). The sampling rate of the digital audio output is fixed at 48kHz.



AES59

Analogue Out

The analog output on the MRK16 is provided through two DB25 connectors (Tascam standard), with channels 1 to 8 on the first connector and channels 9 to 16 on the second. To use this output, connect the adapter cable and tighten the two screws on the connector. The analog output on the MRK16 is self-generated from the MCR54, meaning the MCR54 only outputs in digital, and the MRK16 converts it to analog.

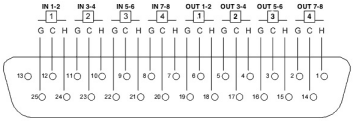
RX 1-8 RX 9-16

ANALOG AUDIO OUT

DB25 connector Pinout

This is the standard TASCAM connector pinout that can be found on mixers, recorders, and other related accessories.

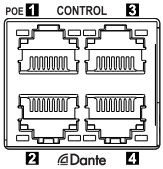
G Ground
C Cold
H Hot



NETWORKING

Ethernet ports

The MRK16 has five different Ethernet ports. The first four (1, 2, 3, 4) use standard Ethernet connectors, while the fifth port uses an optical LC/PC connection.
NOTE: early versions of the MRK16 may not have the LC/PC connectors installed.



The first four ports are configured by default as control (1 & 2) and Dante (3 & 4), but they can be reconfigured using the Dante Controller software. Each connector can be reassigned to be Control, Dante, or Mixed (Dante & Control).
Port 5 is optional. While every MRK16 has the connector mounted on the outside, the internal SFP module must be ordered separately (SFP option). If the module is ordered from Wisycom together with the MRK16, the provided SFP module will be a 1550nm(Tx) / 1310nm(Rx) unit already built into the device. Note that the 5th port mirrors port number 1, meaning if port 1 is configured as Control, port 5 will also be Control; if port 1 is Dante, port 5 will be Dante.

IP configuration

Static/DHCP Configuration:

Use this menu to select whether your unit should operate using DHCP or a static IP address. Note that when using DHCP, a DHCP server capable of assigning IP addresses is required. The Wisycom Manager supports both DHCP and static IP configurations.

IP Address:

After selecting static IP in the configuration menu, navigate to this submenu to choose the IP address based on the network interface in use. You can also modify the IP configuration from the Wisycom Manager by editing the discovery panel.

IP Network Tips:

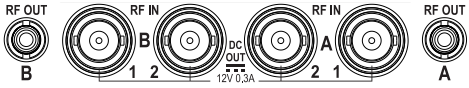
IP addresses often use formats such as 192.168.1.xx or 10.10.10.xx. For optimal performance, ensure that the PC running the Wisycom Manager is in the same address range as your devices. In DHCP-enabled systems, the DHCP server automatically assigns IP addresses to units as they connect to the network.

When using a static IP system, ensure that the connected MRK16 unit(s) and the PC running the Wisycom Manager do not share the same network:
For example, if the PC has a static IP address of 192.168.1.25, a suitable IP address for the first MRK16 could be 192.168.1.26 (provided there is no other device using that address).

In cases where there is no DHCP server available, the PC may self-assign an address like 169.254.69.125. In such instances, assign the MRK16 unit(s) an address within the same range, such as between 169.254.69.2 and 169.254.69.254.

RF SETUP

The MRK16 features 2 diversity RF inputs divided into A1, B1 and A2, B2. These four connectors are BNC type. Each connector is capable of providing 12V bias



The MRK16 has 2 diversity outputs which uses the SMA connector RF OUT A and RF OUT B. Thanks to these connectors it's possible to cascade multiple MRK16 (up to 8 units without any noise increase) or any other wireless microphones system.

Zone 1 & 2 menu

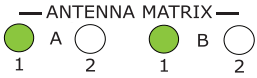
From the setup menu, it is possible to configure the RF zones: Zone 1 (A1, B1) and Zone 2 (A2, B2).

Status:
This setting determines whether the RF inputs are ON or OFF. When set to ON, RF signals are allowed to pass through. When set to OFF, the input is disabled, blocking any incoming signals to protect the unit from unwanted interference.

The status of the antennas can be monitored from the front panel LED on the unit or via the Wisycom Manager:

- A green LED indicates that the zone is enabled, allowing reception from those antennas.

- If the LED is off, the zone is disabled, and reception from that zone will not occur



RF

This setting provides the possibility of switching ON and OFF one or both inputs of your zones.

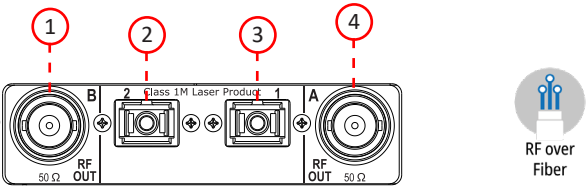
BOOSTER

Switch this option on to provide 12V bias to the connected active antennas or boosters. You can verify if the bias is enabled on that specfic input connector by checking the LED on the front panel. Red LED means antenna is overload, off that there is no bias and if green, that the bias is enabled.

Tip: When an antenna shows as overloaded, you can reduce the RF input to the antenna using the antenna gain control. Alternatively, try moving further away from the source of the interfering RF signal to mitigate the overload issue.

OPTION - EXPANSION BOARD 3 (EX3)

The Expansion Board 3 (EX3) is a slot-in accessory designed to convert two optical input signals into RF. This setup enables users to deploy receiving antennas at a much greater distance (see diagram). Since the EX3 operates independently, to feed the RF signals into the MRK16, you need to daisy chain the RF outputs from the EX3's BNC connectors into the main BNC inputs of the MRK16.

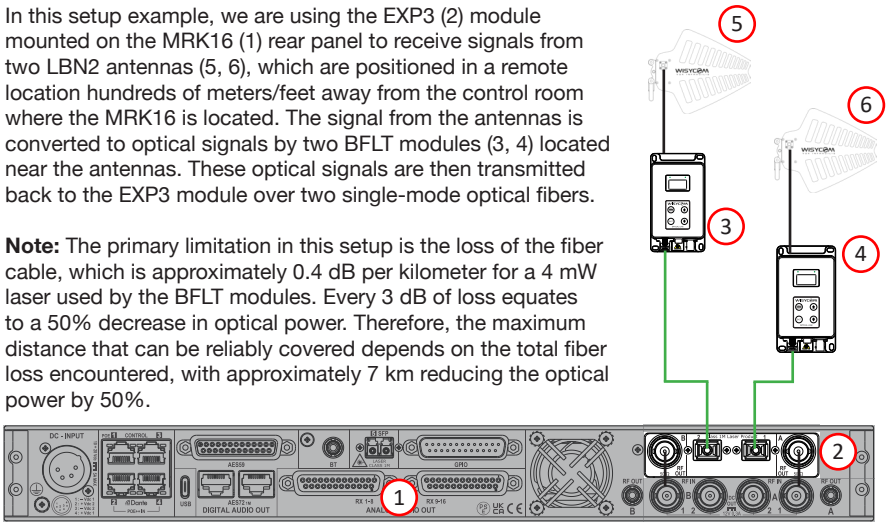


1. BNC output B
2. RF over Fiber Input 2 - SC/APC standard
3. RF over Fiber Input 1 - SC/APC standard
4. BNC output A

Standard configuration example

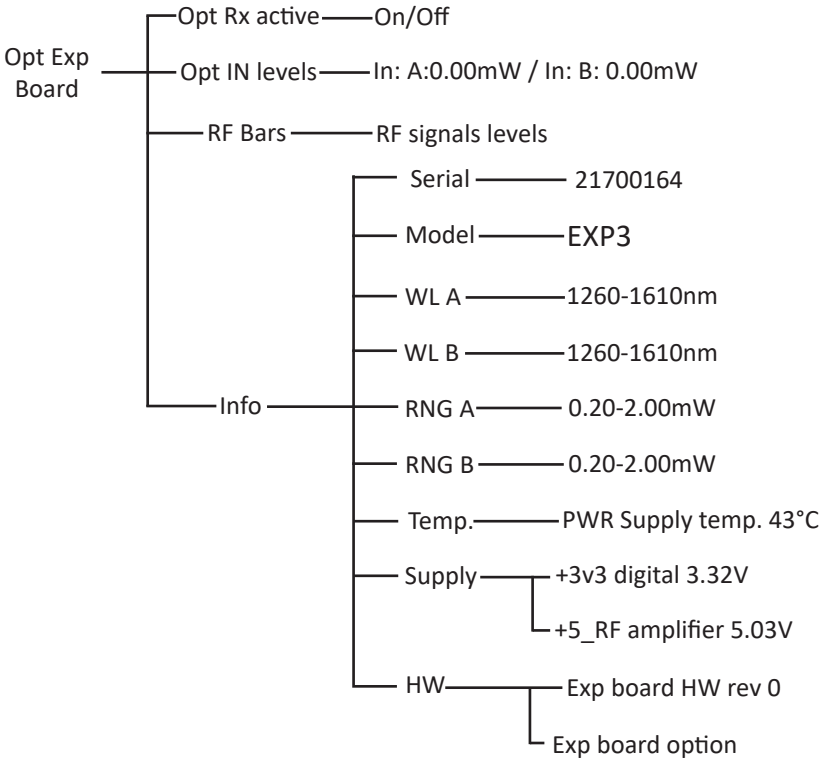
In this setup example, we are using the EXP3 (2) module mounted on the MRK16 (1) rear panel to receive signals from two LBN2 antennas (5, 6), which are positioned in a remote location hundreds of meters/feet away from the control room where the MRK16 is located. The signal from the antennas is converted to optical signals by two BFLT modules (3, 4) located near the antennas. These optical signals are then transmitted back to the EXP3 module over two single-mode optical fibers.

Note: The primary limitation in this setup is the loss of the fiber cable, which is approximately 0.4 dB per kilometer for a 4 mW laser used by the BFLT modules. Every 3 dB of loss equates to a 50% decrease in optical power. Therefore, the maximum distance that can be reliably covered depends on the total fiber loss encountered, with approximately 7 km reducing the optical power by 50%.



Expansion board Menu

MRK16 automatically detects the Expansion Board connected so it will show this menu only if there's the board inside.



MRK16 INFO MENU

Use this menu to access information about the device, including its serial number, frequency range, firmware version, and hardware version. Additionally, you can monitor its status, including voltage, temperature, and any alarms present.

Serial
The serial number uniquely identifies the unit and consists of 8 characters.
FW
This displays the current firmware version installed on the device.
HW
Shows the hardware revision of the unit.
Diagnostic
This menu provides information about potential unit overload issues, high temperatures, and alarms that may be present. It helps in diagnosing any operational concerns and ensuring the device is functioning optimally.

Option - GPIO BOARD (GP1)

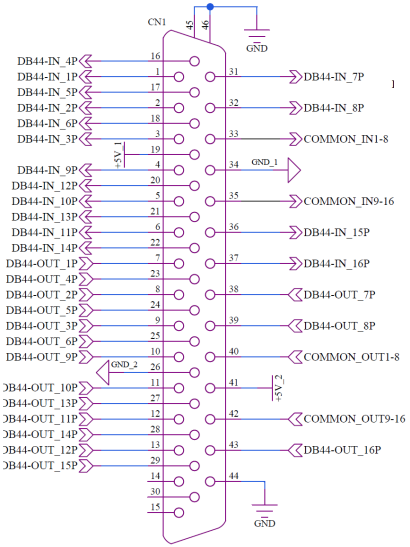
When the MRK16 is equipped with the GP1 option, a SubD 44-pin connector is available on the rear panel. This connector allows for the management of the following:

- **16 outputs:** These outputs provide 28Vdc or 20Vac with a maximum current of 70mA. Outputs are normally open and isolated, meaning they are typically not connected to ground or power by default, and each output is electrically separate from the others.

- 16 inputs: These inputs accept voltages ranging from 4Vdc to 28Vdc with a maximum current of 1.5 mA.

This configuration provides versatile control and interfacing capabilities for various applications requiring both output and input management through the SubD 44-pin connector on the MRK16.
This means that the outputs are typically not connected to ground or power by default, and each output is electrically separated from the others.
Common ports share pins for 8 inputs and outputs.
For example, pin 33 serves as the common port for inputs 1 to 8. This suggests that pin 33 is used as a common reference or ground point for these inputs.

Two power supplies are provided:
- Pin 19 provides one power supply (5V, max 200mA).
- Pin 41 provides another power supply (5V, max 200mA).
- These power supplies have separate and isolated grounds.
- Pin 34 serves as the ground for one power supply.
- Pin 26 serves as the ground for the other power supply.

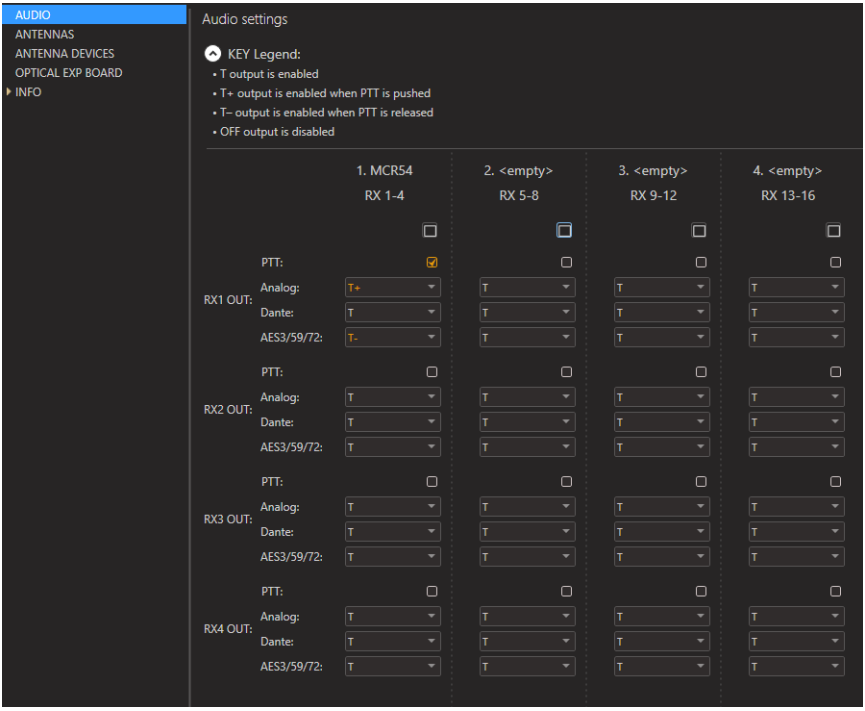


PTT MANAGEMENT

It sounds like the PTT (Push To Talk) feature on the Wisycom system allows for remote control of receiver outputs by pressing the PTT button on compatible Wisycom transmitters (e.g., MTH410 with PTT305 accessory or MTP60 with ADT30 accessory).

To configure the PTT functionality on the MRK16, follow these steps:
- Connect the MRK16 to the Wisycom Manager.
- Navigate to Settings > AUDIO in the Wisycom Manager interface.
- Enable or disable the outputs (Analog, Dante, or Digital) independently based on the status of the PTT button (pushed or released) for each of the receivers.

The legend provided in the image below explains the settings and options available for configuring the PTT feature. This setup allows for flexible control over audio outputs depending on the PTT status, enhancing operational convenience and control in professional audio applications.



Note: This feature requires firmware versions MRK16 v1.4.0, MCR54 v2.5.0, and Wisycom Manager v3.8.2 or later to be implemented. Please ensure your devices are updated to these versions to utilize the PTT functionality effectively.

TECHNICAL SPECIFICATIONS

RF SPECIFICATIONS	**Frequency ranges**	470 - 1260 MHz (full range)
	Filter selection	10 automatically selected band-pass filters: 470-608 MHz 470-694 MHz 470-832 MHz 470-1260 MHz 510-608 MHz 510-694 MHz 510-832 MHz 510-1260 MHz 822-1260 MHz 940-1260 MHz
	Antenna connector	4 x BNC type female connectors for inputs, 2 x SMA type female connectors for loop
	Antenna input impedance	50 Ohm
	Spurious emissions	< 2 nW
	Input/output gain	1dB ± 1
	Input/cascade gain	1dB ± 1
	IP3	14 dBm
	Antenna booster powering	+12 Vcc / 300 mA MAX
AUDIO	**Analogue audio output**	2 x DB25 connectors (TASCAM)
	Digital audio output	AES59 (DB25 connector) and AES72 1M (2 RJ45 connectors)
	Dante output	Dante Primary and Secondary (2 x 1000 Base TX RJ45 Ethernet)
	Monitor output	headphone 6.3 mm jack socket, volume adjustable with a front knob
OTHERS	**LED**	4 LEDs indication for the zone activation status (red, green, off) 4 LEDs indication for the booster status (red, green, off) 4 LEDs indication for the power supply status (red, green, blue, off) 1 LED indication for the MRK16 status (green, off)
	Max number of receiver slots	4
	Max number of channels	16 (with MCR54), 8 (with MCR54-DUAL)
	Managing interface	2 x 1000 Base TX RJ45 Ethernet, Remote Control Interface, USB-C with powering 3A@5V (optional) and thru display menu of the 1st receiver on the right
	Powering	10÷ 28 Vdc, 5A max, redundant DC Vdc1 and Vdc2 on XLR M-4pin PE1 option: Power Over Ethernet board: - dual POE++ input on eth 2/4 (redundant pwr supply) - POE output on eth 1 (external Wifi, Bluetooth antenna)
	Power consumption	60W with 4 MCR54s and 4 active boosters
	Power supply output	on USB-C port to connect external device (e.g. tablet) 1.5 A max (optional)
	Temperature range	-10 ÷ +55 °C
	Dimensions	44 x 483 x 352 mm (HxWxD)
	Weight	4.3 Kg. with 4 MCR54s and EXP2 board, 3.30 Kg. without MCR54s

SAFETY INSTRUCTIONS

- Follow all instructions and information.
- Do not lose this manual.
- Do not use this apparatus in the rain or near water.
- ATTENTION: supply the apparatus with the correct mains voltage and with the ground connection. Check the power cord integrity.
- The power cord must be protected from damage.
- Do not install the apparatus near heaters or in hot environments, do not use outside the operating temperature range.
- Mount the apparatus as indicated in the instruction, do not block side grilles from air ventilation.
- If an external air filter is mounted, clean it regularly.
- WARNING: do not open the apparatus, RISK OF ELECTRIC SHOCK!
- Do not open the apparatus, only qualified service technicians are authorized to work on it. The apparatus needs servicing when is not working properly or is damaged by liquids, moisture or other objects have fallen into the apparatus.
- Use only accessories or replacement parts authorized or specified by the manufacturer.
- Do not supply more than seven MRK980 from the mains output, see power requirements for other apparatus.
- Clean the apparatus only with dry cloths, do not use liquids.
- The ON/OFF is a double pole circuit breaker, but to ensure the complete disconnection of the apparatus, disconnect the power cord.
- Provide the serial number and the purchasing date in front of the manual, it is needed to have proper replacement parts or accessories from the manufacturer.
- When replacement parts are needed, use only replacement parts authorized by the manufacturer. Substitution with not authorized parts could result in electric shock, hazards or fire.
- Pay attention to all the labels with warnings or hazards on the apparatus.

WARNING: The apparatus is intended for professional use, anyway the manufacturer alerts the user that the headphone output power of the apparatus could exceed the level of 85 dB(A) of sound pressure level and this could be dangerous for hearings. Do not use headphones with high power level or for a long time. Reduce the power or stop listening in case of any kind of hearing problem.

WisyCom srl

Via Tiepolo, 7/E
35019 Tombolo (PD) – Italy
VAT# IT02765640244

Tel. +39 0424 382605
e-mail : sales@wisycom.com