

## WIRELESS-MICROPHONE SYSTEMS

### MRK 920 - UHF MULTICHANNEL RECEIVER SYSTEM



#### MRK 920 - Multi-channel Receiver System

The MRK 920 is the result of years of development in the wireless technology.

As top working quality product, it has been designed with some special functions very useful to wireless-microphone users. The MRK920 receiver system is very flexible and is built on a modular architecture.

It works in a receiving switching-window of 32 MHz (or 40 MHz, upon request), that can be moved by the user in a tuning-range of 152 MHz.

MRK 920 System standard version can be ordered in 3 configurations operating in different sub-bands:

- MRK 920-LB (Low Band), frequency tuning-range 470 ÷ 622 MHz
- MRK 920-MB (Medium Band), frequency tuning-range 598 ÷ 750 MHz
- MRK 920-HB (High Band), frequency tuning-range 726 ÷ 878 MHz.

MRK 920 System is also available in a basic version:

- MRK 920-EL (Entry Level), with a fixed 32 MHz tuning-bandwidth between 470 ÷ 878 MHz.

MRK 920 System is highly modular and can allow later upgrades or changes in configurations:

- Entry level MRK 920-EL can be later upgraded to standard version (extended tuning range)
- MRK 920 system can be changed to a different tuning range (ie. Low Band to Medium Band)

This is achieved changing to different module components that can be easily plugged in:

- RFI 920-xx - RF-Module
- MSR 920-xx - Receiver-Modules.

The MRK 920 Receiver System has an exceptional high selectivity and intermodulation-immunity. This allows the best operating performance of the wireless-microphone systems even in the presence of strong DVB-T transmitter's signals.

The MRK 920 system has also an exclusive PTT function. This was recently developed by Wisecom and now is appreciated in the broadcast world.

MRK 920 si able to work directly with the new wireless microphones endowed with built-in telemetry (either MTP 22 body-pack or MTH 200 hand-held transmitters) and Push-To-Talk button: the push of this button causes the remote switching of the receiver's output-line from the *main line* to the additional *intercom line* to talk "off-air" directly with the technical team.

AIM 920 Intercom Module is available with PTT function, supplied with audio and GPI (General Purpose Interface, with relay dry-contacts) outputs, dedicated to the connection with the local intercom network. The audio and GPI switching-functions controlled by the PTT button can be pre-set by a software matrix and stored in each receiver trough the relevant menu.

A wide range pre-tuned switching-window in the receiver ensures the following advantages:

- Maximum working quality, no matter what circumstances cause the interference, even that which occurs when high-power wireless microphones are used to overcome problem areas (for example: the interference caused by newly allocated DVB-T transmitters).
- The possibility to directly adapt the system to different operating areas (for example: OB-Vans).
- Maximum flexibility and ability to work with existing wireless microphone systems.
- Simple and quick substitution of spare modules (even directly in the field) for maintenance operations.

These features provide an excellent, cost effective system allowing continued use for many years.

Rack-frame's front-panel can host the following modules:

### MSR 920 - Receiver Modules

Depending on the user's needs, two types of Receiver Modules can be supplied:

- ⇒ MSR 920-xB, with a 152 MHz tuning-bandwidth.  
Available in 3 options covering the following UHF sub-bands:
  - MSR 920-LB (Low Band), frequency tuning-range 470 ÷ 622 MHz
  - MSR 920-MB (Medium Band), frequency tuning-range 598 ÷ 750 MHz
  - MSR 920-HB (High Band), frequency tuning-range 726 ÷ 878 MHz.
- ⇒ MSR 920-EL (Entry Level), with a fixed 32 MHz tuning-bandwidth between 470 ÷ 878 MHz.

The MRK920 Receiver System has been developed in order to support a high number of working functions, that are set either directly on the front panel of every MSR 920 Receiver Module or by a PC connected to the system via Ethernet. We developed an intuitive and easy-to-operate front-panel, able to simplify and speed up programming of each single Receiver Module, avoiding mistakes (even in emergency circumstances or by inexperienced personnel).

On the front-panel you can see, clearly and all at the same time, several operating parameters:

- the RF-signal levels (in  $\mu$ V) of both A and B antenna-inputs, with LED bar graphs;
- the instant indication of the strongest antenna input, controlled by the diversity circuit;
- the operating state of the tone-squelch circuit and of the PTT mode;
- the modulation's deviation (in % referred to the nominal value), with the multicoloured LED bar-graph provided with a peak-hold function (can be switched off);
- the PTT function circuit status (it indicates the PTT activation of the "main line" output, of the "intercom line" output and of the "GPI output");
- the transmitter's battery charge status (100% - 75% - 50% - 25% - 12,5%);
- the indication of the 1 KHz calibration AF tone (if switched on) on the related audio line output.

The MSR 920 Receiver Module includes a large display easily and quickly configurable with the related "function-buttons", for the direct setting of the most important operating functions.

Each parameter (to be pre-set) can be recalled pushing the relevant push-button (used parameters only are gathered under the "OPT" push-button). Once recalled, the parameter to be modified has to be confirmed by pushing the "push to select" rotary-knob, and then modified rotating the same selector. The pre-set value is displayed on the large matrix-point display on the front-panel.

Using function button each receiver module can be configured with the following pre-set parameters:

#### **CH** - channel number and the related group

After pushing, the display can show: **Ch x Gyy** or **Ch x Uyy**.

**Ch x** is the channel-number, where **x** is a digit between 0 to 9 and A to F

**Gyy** is the "standard" group, where **yy** is a number between 1 to 16

**Uyy** is the "user" group, where **yy** is a number between 1 to 16

Using the rotary-knob (by pushing it and then rotating it) it will be modified at first the **Ch** number and subsequently the **Gyy** and **Uyy** group number.

Note 1: in order to avoid any operator's mismatch, the frequencies of the **Gyy** "standard" groups **can not** be modified by the front-panel keyboard, but only by means of the pc and remote-control-software.

Note 2: in order to avoid any operator's mismatch, if it has been selected a frequency that is outside the pre-set 32 MHz switching-window, the **CH** display shows a blinking **LOW** or **HIGH** word.

#### **FRQ** - receiver operating frequency

After pushing, the display can show: **x MMMkkk**.

**x** is the channel-number used at that time

**MMMkkk** is the channel-frequency, displayed in MHz and KHz

Using the rotary-knob (by pushing it and then rotating it) it will be modified at first the MHz value and subsequently the KHz value.

Note: in order to avoid any operator's mismatch, the frequency of the **Gyy** "standard" groups **can not** be modified by the front-panel keyboard, but only by means of the pc and remote-control-software.

**SQ** - threshold level of the analog squelch circuit (in  $\mu$ V)

After pushing, the display can show: **sq OFF** or **sq xxxx $\mu$ V** (**xxxx** is the threshold value in  $\mu$ V).

Using the rotary-knob (by pushing it and then rotating it) the threshold value of the analogue squelch will be modified.

The optimum threshold value depends on the level of the environmental RF noise captured by the antennas.

**TSQ** - tone-squelch and PTT functions

After pushing, the display can show: **TSQ OFF** or **TSQ ON** or **TSQ PTT** or **PULSE**\*

**TSQ OFF** means that the tone-squelch circuit is inoperative

**TSQ ON** means that the receiver will open the AF main output when the special digitally modulated sub-carrier of the Wisecom transmitters is correctly received

**TSQ PTT** means that in the receiver has been activated the PTT function; consequently the AF "main" and "intercom" outputs and the GPI output are working according to the pre-setting of the "PTT matrix" done by means of the optional remote-control-software.

**PULSE** means that the receiver can decode the transmitter's battery charge status if it works based on impulse data coding. Tone squelch function is disabled and works as "TSQ OFF".  
*(\* available only with "DBS" option installed).*

**NAME** - name assigned to the receiver module

After pushing, the display shows the name assigned to the RX module.

Using the rotary-knob (by pushing it and then rotating it, character after character) you can change the name (8 characters max.).

**OPT** - optional functions and pre-settings

In the sub-menu you can pre-set the following parameters and functions:

**PK HOLD** indicates the display time mode of the AF bar-graph.

By pushing and rotating the rotary-knob, you can set either the **PEAK OFF** or **PEAK ON** modes.

**CAL TONE** the receiver can generate a 1KHz test tone, that will be injected in the AF main line (and in the intercom line too, as pre-set by the remote-control-software).

By pushing and rotating the rotary-knob, you can set either the **TONE OFF** or **TONE ON** status.

**FieldRec** the receiver itself (even without any pc-connection) can carry-out a coverage test of the stage.

By pushing once the rotary-knob, the display shows **RecSTART**.

A next pushing on the rotary-knob set the receiver to measure continuously the present field-strength (while the operator make a walk on the set) and to display its max and min limits on the left ("A") bar-graph. A next pushing provoke the **Rec STOP** condition, so the signal strength limits (during the walk) can be carefully evaluate.

With a further pushing (**Rec EXIT**) the receiver go back on the standard conditions.

**NOISE RD** on the receiver it is possible to set different noise-reduction modes, that you can select by pushing and rotating the rotary-knob:

**ENR** = the noise-reduction mode used actually by Wisecom.

(It is completely equivalent to the HyDynPlus mode.)

**NR** = an old noise-reduction mode, still employed in some radio-mics used in the musical market.

**None** = The noise-reduction circuit is switched off.

**TEMP °C** by pushing once the rotary-knob, the display shows the temperature of the internal board of the receiver module. For instance: **T 437 °C**

**FW. REL.** by pushing once the rotary-knob, the display shows the firmware release actually stored in the receiver. For instance: **FW 2.00E**

**RANGE RX** by pushing once the rotary-knob, the display shows the frequency limits (in MHz) of the pre-tuned switching-window of the receiver module.

The working switching-window (32 or 40 MHz) of the complete MRK 920 Receiver System (except for the EL version) can be moved across the whole tuning-range (152 MHz) by means of the rotary selector, situated on the panel of the RFI920-xB Filter/Amplifier Module, or through the remote-control-software.

**RANGE RF** by pushing once the rotary-knob, the display shows the frequency limits (in MHz) of the whole tuning-range of the complete MRK920 Receiver System.

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**InitDisp** allows to set the parameter displayed as first, when the receiver system has just switched on. You can select between following initial displays: **NAME** or **CHANNEL** or **FREQ**.

Besides the above function-buttons, the MSR920 Receiver Module performs also the following push-buttons:

**LOCAL**

allows the operator to hold the control of the receiver through the front-panel, when the unit has been operated by the pc and remote-control-software and consequently the **REMOTE** red light is on.

**Headphones  
push-button**

once pushed, the push-button with the “headphones icon” allows the monitoring of the AF output of the receiver through the general monitor output, endowed with  $\frac{1}{4}$ ” (6.3 mm) stereo jack plug and placed on the front panel of the “Rack Frame Control Module”. When the receiver’s monitor output is activated on the general monitor output, the **MONITOR** red light is on.

**Volume  
push-button**

the push-button with the “volume icon” is correlated with the secondary AF monitor output, placed on the receiver’s front panel and endowed with 3.5 mm jack plug. Once pushed, on the display appears the monitor volume menu, that allows the volume adjustment of the secondary monitor output through the rotary-knob.

**Rack Frame Control Module** (on the right side of the rack’s front-panel)

From its front-panel, the following controls can be operated and monitored (from up to down):

**MAINS SWITCH****POWER SUPPLY MONITORING**

They are two signalling Leds for the Power Supply Modules **PS1** and **PS2**.

When is lighting, each green Led confirms that the relevant Power Supply Module is right working.

**ANTENNA SUPPLY SWITCHES AND MONITORING**

The power for each “A” and “B” antennas can be separately switched On/Off by means of the relevant switches. Both powering circuits are self-protected against short-circuit and over-voltages.

The WISYCOM ABN10-32 Active Antenna is endowed with an filter/amplifier module, that is connected on the circuit through a couple of RF relais. Therefore, when not-powered, the active antenna works as a normal passive antenna.

When an antenna-switch is turned on, the relevant **V** and **I** green Leds allow to monitor the right working of the coax line:

- ⇒ The **V** Led is lighting when the power for the antenna is present on the receiver’s RF input connector: this means that the coax cable is not short-circuit.
- ⇒ The **I** Led is lighting when the absorbed current is right for at least a connected antenna: this means that the coax cable is not interrupted.

**HEADPHONE CONNECTOR AND VOLUME CONTROL**

There is a AF monitor general output, with a  $\frac{1}{4}$ ” (6.3 mm) stereo jack plug and volume control. The audio output of each receiver (one at a time) can be monitored through this output, pushing the relevant **MONITOR** push-button with the “headphones icon” placed on the receiver’s front panel.

## Rack-frame's back-panel

In the rack-frame's back-panel, following non-optional and optional modules can be used:

### PSS 920 - Power-supply Module (s)

Although the MRK 920 Receiver System can work normally with only one PSS 920 Power-supply Module, a second (optional) PSS 920 Power-supply Module can be added (for safety reasons) and powered by a separated mains source.

### RFI 920-xx - RF-input module

Depending on the user's needs, two type of RF-input modules can be supplied:

- ⇒ RFI 920-xB, with a 152 MHz (= 19 TV channels) tuning-range.  
This module's type can be supplied with one of the following UHF sub-bands:
  - RFI 920-LB (Low Band), frequency tuning-range 470 ÷ 622 MHz
  - RFI 920-MB (Medium Band), frequency tuning-range 598 ÷ 750 MHz
  - RFI 920-HB (High Band), for the frequency tuning-range 726 ÷ 878 MHz.
- ⇒ RFI 920-EL (Entry Level), with a fixed 32 MHz switching-window between 470 ÷ 878 MHz.

On the front-panel of the RFI 920-xB Modules, a display shows the pre-set switching-range (pointed out as numbers of TV-channels). Directly from the module's panel, through the apposite screwdriver-selector, or by means of the WSW 920 remote-control software, the switching-range can be modified inside "hardware" frequency limits.

All the RFI 920-xx modules are endowed with built-in antenna splitter for the cascade-connection of one additional MRK 920 receiver system.

### ASM 920 - Main AF-line Output Module

It includes 8 x "main audio outputs" with XLR-3 connectors.

Each output line is provided with individual balancing transformer and high-performance AF amplifier, with very low-impedance and high-current capability to allow feeding even to very long audio lines. If you prefer different connectors for the AF-outputs, it is available the ARM 920 Main AF Output Module, endowed with RJ45 connectors instead of the XLR-3 ones.

### AIM 920 - Intercom AF-line & GPI Output Module (optional)

It includes:

- 8 x "Intercom audio outputs" with sub-D25 connector, and
- 8 x "GPI outputs" (relay dry contacts) with sub-D25 connector.

Each "Intercom audio output" and "GPI output" are monitored by an individual Led signalling and is controlled by the PTT push-button of the linked wireless-microphone transmitter.

Each audio output line is provided with individual balancing transformer and high-performance AF amplifier, with very low-impedance and high-current capability to allow feeding even to very long audio lines.

Note: if you don't need the AIM 920 Module, in the same place can be inserted a second ASM 920 Main AF-line Output Module.

### EIM 920 - Ethernet TCP/IP Interface Module (optional)

The modules comes complete with the WSW 920 remote-control software, suitable for the complete remote-control of one or more MRK 920 Receiver Systems.

The WSW 920 software includes also some useful and appreciated automatic functions:

- *2D spectrum analysis* of full tuning-range;
- *3D (time related) spectrum analysis* of full range;
- *Walk-test*, that allows the monitoring of the received field-strength of one wireless-microphone transmitter in a selected period of time. The walk-test can be carried-out by the operator itself to control the optimum coverage of the system in the whole set.

