MTH400 User Manual

Wideband Wireless

Professional Handheld

Transmitter

SN: _____

Rev.05 (rif. FW 1.22.0F)

Date: 04 February 2015

INTRODUCTION

MTH400 is a professional radio microphone especially designed for broadcast/high quality applications.

MTH400 is composed by 3 detachable parts:

- ***MIC Head*** (available with cardioid/hyper-cardioid polar pattern).
- ***MIC Body*** (the below part can be open to access "Display & Setup controls" area (fig.1) and on the back the "Batteries holder & Infrared" area (fig. 2).
- ***MIC Antenna***, made with fibreglass reinforced housing and with a "Wireless power switch" (fig. 3). "MIC Antenna" is fastened to body with 2 anvils and a micro-connector.

Open MIC Body:
Unscrew & slide down cover,
To access internal setup controls and
batteries holder & infrared.

Wireless power switch with programmable LED indication (green/red).

Exchange head:
unscrew it counter-clockwise

Fig. 3 Wireless power switch

Fig. 1 Display & Setup controls

Fig. 2 Batteries holder and infrared

SAFETY INSTRUCTION

- Read this safety instruction and the manual first
- Follow all instructions and information.
- Do not lose this manual.
- Do not use this apparatus under the rain or near the water.
- Do not install the apparatus near heaters or in hot environments, do not use outside the operating temperature range.
- Do not open the apparatus, only qualified service technician are enabled to operate on it. The apparatus needs servicing when it is not properly working or is damaged by liquids, moisture or other objects are fallen in the apparatus.
- Use only accessories or replacement parts authorized or specified by the manufacturer.
- Clean the apparatus only with dry cloths, do not use liquids.
- Report 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 from the manufacturer. Substitution with not authorized parts could result in electric shock, hazards or fire.
- Keep attention on all the labels with warnings or hazards on the apparatus.

LED INDICATION (POWER SWITCH)

Led indication with bicolor led (red & green) on wireless power switch (fig. 3):

- Wireless transmission status: green on/off
- Battery status: green steady, slowly blinking (< 25%), quickly blinking (<12%)
- Modulation peak (if activated): red
- PTT status: red if active

BATTERIES

MTH400 is working with 2 AA alkaline or NiMH batteries (select correct type on setup controls). Battery status can be checked on internal OLED display or looking to LED status on power switch (see LED INDICATION section).

Battery substitution:

- Open MIC body: unscrew counter-clockwise the below cover to access batteries holder;
- Take out below battery to release upper battery leverage;
- 2nd battery falls down and can be remove

Attention: always replace both the batteries

POWERING UP

Move the wireless power switch (fig. 3) in upper position (towards MIC body) to activate wireless transmission: a green LED lights up (blinking when battery is low!).

SETUP CONTROL

Open MIC Body to access the "display and controls" area (fig. 1):

A. Graphics Display (**OLED**)
B. Channel selection buttons (**ch**)
C. MIC gain setup buttons (**gain**)
D. 3 position selector (**up** / **down** / **click**)

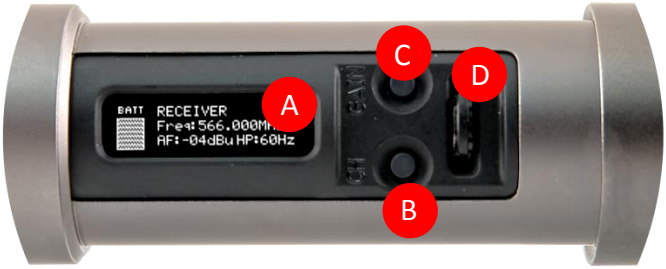


Fig. 4

OLED POWER UP (OLED IS IN OFF CONDITION)

Pushing down selector (**click**), the graphic display oled turns on.
At the beginning a <BOOT> menu is displayed, then <STATUS> menu enters automatically. In order to keep the <BOOT> menu active, it is necessary to push and hold selector (click) for at least 2 sec.

<BOOT> menu

In the <BOOT> menu it is possible to found information regarding the Hardware and Firmware.

- Model (MTH400)
- Band (ex. 2)

1	470-640
2	566-798
3	510-698

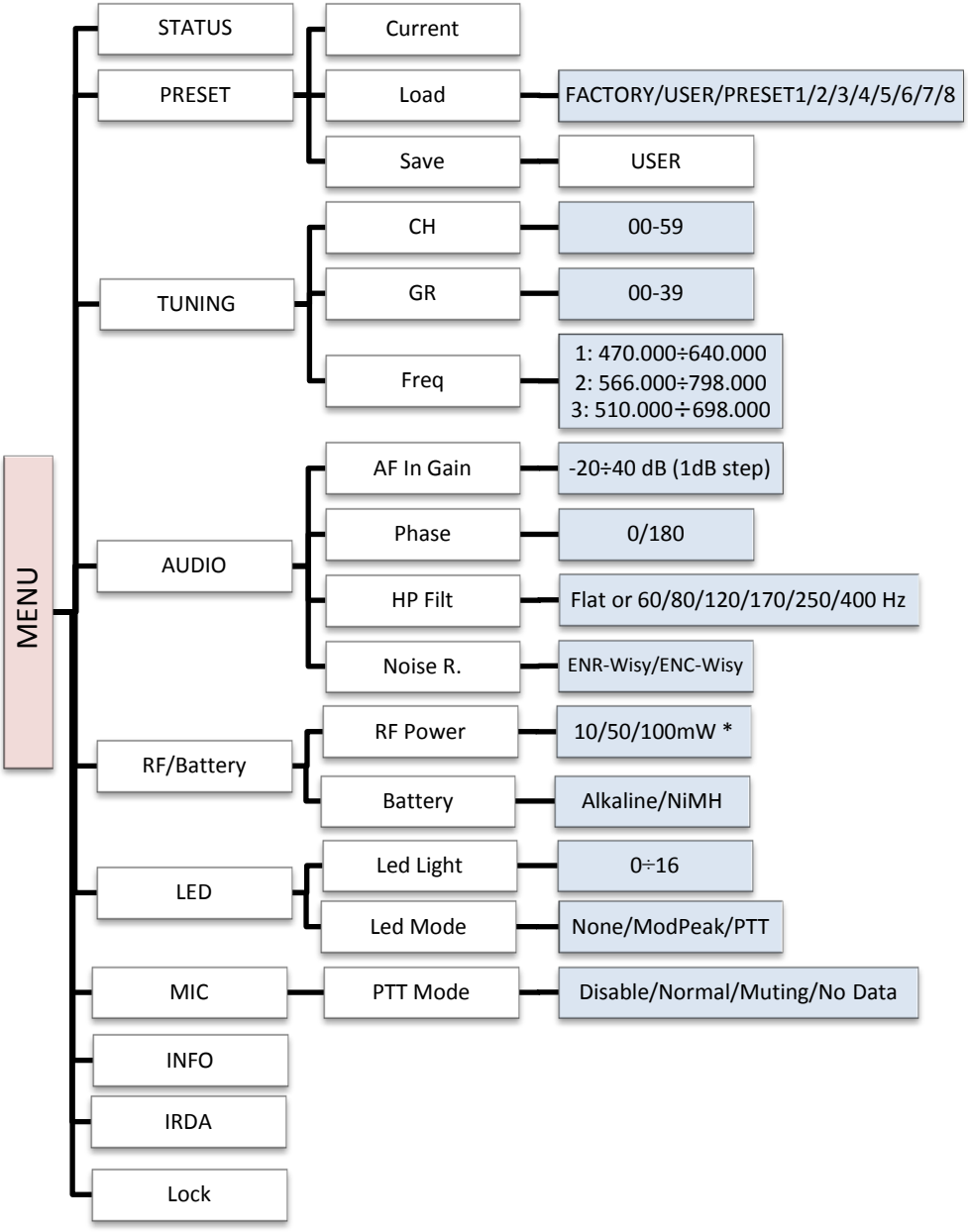
- Hardware revision (ex. 3)
- Firmware version (ex. 122 0F)
- Band in extended format (ex. 566-798)
- Serial number (ex. R4528525)

OLED POWER DOWN (OLED IS IN ON CONDITION)

Display turns off automatically after 15 sec, unless in <IRDA> menu or in <AUDIO> menu (with audio level < 5% from nominal).

DISPLAY MENU

Using **up/down** selector all menus can be accessed in sequence.



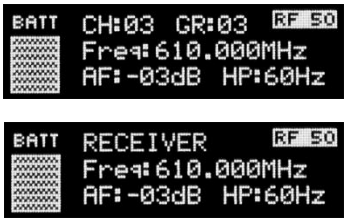
* Depending on the Power Profile

Using <up/down> selector all menus can be accessed in sequence, push <click> to enter edit mode: (on the left side of the display appear "EDIT" and the selected parameter starts blinking):

<**up/down**> to setup field
<**click**> again to confirm changes and exit.
If no button is pressed, the device exits the EDIT mode and returns the parameter as it was previously set.

<STATUS> menu

This is the first menu displayed after power up.

	Major info are displayed: - Current channel/group (i.e. CH:03 GR:03) or Receiver's name (i.e. RECEIVER) if the microphone has already been synchronized with a receiver - Current frequency (i.e. 610 MHz) - Mic gain (i.e. -03dB) and high pass filter (i.e. 60Hz) - If in the top right there is "RF10", "RF 50"or "RF 100", the transmission is active respectively at 10, 50 or 100mW (see RF/BATTERY menu) - On left side, the battery bar is displayed

<PRESET> menu

This menu can be entered by scrolling selector.

	This menu allows to load a PRESET configuration, modify the desired parameters (using the next menus) and save the new configuration to the USER configuration. When the user changes some parameters from the PRESET configuration (for less than frequency) a star appears on the top-right corner until a save command is executed.

<TUNING> menu

This menu can be entered by scrolling selector or using *quick channel setup* button (**ch**).

	In this menu current channel/group and frequencies can be setup. *Sync* group is a quick self-settable channel synchronized from receiver.

<AUDIO> menu

This menu can be entered by scrolling selector or using *quick gain setup* button (**gain**).

	The first AUDIO menu allows to set the **AF Gain** from -20dB to 40dB. To help proper audio gain setting, an audio bar is supplied (with peak hold bar) → **TRY TO SETUP TO HAVE A MAX PEAK HOLD BAR CLOSE TO -6dB**.
	The second <AUDIO> menu allows to set: - audio phase (0° or 180°) - High Pass filter (Flat, 60, 80, 120, 170, 250, 400 Hz)
	The third <AUDIO> menu allows to set the Noise Reduction (**ENR-Wisy** noise optimized or **ENC-Wisy** hi fidelity/voice optimized)

NOTE: To show the three menu screen it's necessary to scroll down with the selector.

<RF/BATTERY> menu

This menu can be entered by scrolling selector.

	**RF power** can be setup to 10mW, 50 mW or 100mW (depending on the Power profile). *If it's selected "10mW", in the top right on the STATUS menu appear "RF10".* *If it's selected "50mW", in the top right on the STATUS menu appear "RF50".* *If it's selected "100mW", in the top right on the STATUS menu appear "RF100".* **Battery** type can be setup in Alkaline or NiMH.

<LED> menu

This menu can be entered by scrolling selector.

	Power switch green LED brightness can be setup → **Led light** (from 0 to 16). **Led Mode** setting define when the LED on the power switch (see Fig. 3) have to become RED: - None: never, - ModPeak: when audio get close to saturation) - PTT: when the PTT button is pushed

<MIC> menu

This menu can be entered by scrolling selector.

	4 different **PTT** mode can be selected: Disable, Normal, Muting, No Data.

<INFO> menu

This menu can be entered by scrolling selector.

	In this menu it's possible to see if some options are configured on the device (in this case there aren't any options)

<IRDA> menu

This menu can be entered by scrolling selector.

	By this menu, MIC can be connected to IRDA for setup or firmware upgrades.

NOTE: while in this menu display is not automatically turned off.

<LOCK> menu

This menu can be entered by scrolling selector.

	Long pressing (2 sec.) selector button (**click**) it locks MTH400 in transmission mode. To unlock, long pressing (2 sec.) selector button again.

<BOOTLOAD> menu

This menu can be entered only turning on the transmitter while pushing **at the same time** both quick channel setup buttons (**<ch>** & **<gain>**).

	Device is forced in bootloader mode to allow **FIRMWARE UPDATE**.

The following table sums up which parameters can be set and the related range settings.

MENU	PARAMETER	MEANING	RANGE SETTINGS
TUNING	CH	Channel	0 ÷ 59
	GR	Group	0 ÷ 39 + SYNC GROUP
	Freq	Frequency	It depends on the MTH400 Model: 1 470-640 2 566-798 3 510-698
AUDIO	AF Gain	Gain of the audio signal	-20dB ÷ 40dB step of 1 dB
	Phase	Audio signal phase	0° or 180°
	HP	High Pass filter	Flat/60/80/120/170/250/400 Hz
	Noise R.	Noise reduction	ENR: Wisycom Extended-NR, noise optimized ENC: Wisycom Extended-NC, voice optimized
RF/BATTERY	RF Power	RF Power	10mW or 50mW or 100mW (depending on the power profile)
	Battery	Battery type	Alkaline or NiMH
LED	Led Light	Power switch green brightness	0 ÷ 16
	Led Mode	It defines when the power switch led (see Fig. 3) has to become RED	None: never ModPeak: when audio get close to saturation PTT: when the PTT button is pushed
MIC	PTT Mode	It defines how and what information the transmitter has to send	**Disable**: when the PTT button is pushed, nothing happen. (the transmitter sends AF+Tone squelch) **Normal**: when the PTT button is pushed, the transmitter send a different RF signal. According to the receiver configuration the audio can be enabled/disable on LINE (and/or COM). **Muting**: the transmitter doesn't send the audio. The voice is cut, it doesn't enter to the microphone **No Data**: the transmitter sends neither tone squelch nor battery data.

HOW TO USE WISYCOM TX MANAGER (V.1.1.5 OR ABOVE)

Wisycom TX Manager allows to read, modify and update the configuration of Wisycom transmitters.
It is necessary to

- connected the programmer UPK300E/UPKMini or the receiver MRK950/MRK960 to the PC thru **USB connection**
- run the Wisycom TX Manager
- enable the IRDA communication on the transmitter (see IRDA menu)

NOTE: Wisycom IR Programmer doesn't work whit MRK950/MRK960 if it is connected to the PC using an Ethernet cable.

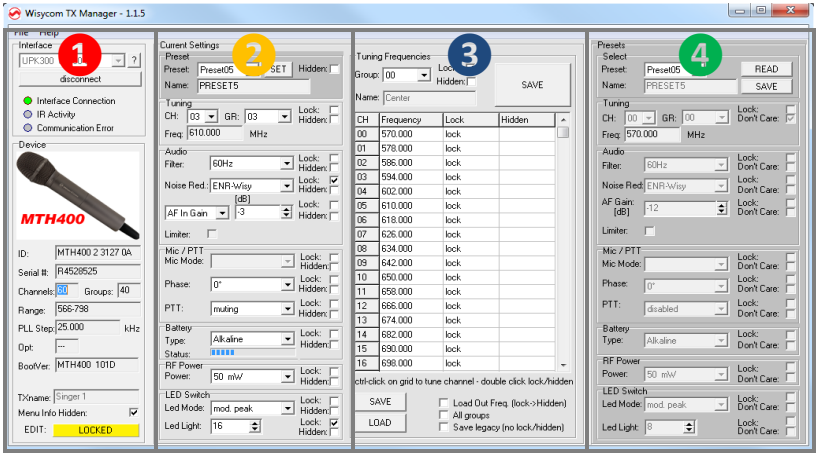
The Wisycom IR Programmer's window is divided in 4 parts (see the image below):

1 **Interface** and **Device** panel contains all the major information of the connected **d**evice

2 **Current Settings** panel shows the current configuration. Thanks the PRESET panel, a previous saved configuration can be chosen and loaded like current setting.

3 **Tuning Frequencies** panel allows to handle Groups, Channels and Frequencies

4 **Presets** panel allows to read, change and save different configurations



10 different configurations are available:

- FACTORY configuration is a locked configuration: no parameter can be changed.
- USER configuration is the only configuration that can be saved using the OLED display (see <PRESET> menu). Note: It is not possible to change the name of this configuration.
- Other 8 configurations where the user can change both the name and the values of all parameters.

INTERFACE AND DEVICE PANEL

At the beginning, the program checks which IR devices are detected and they appears on the **Interface** panel.

The user has to select the device and push <connect> button in order to open the communication with the IR device. A picture on the top in the Interface panel help the user in this selection showing the type of devices detected. During this process the "IR activity" led blinks to indicate that the program wait connection's answer from the IR device.

A successful connection is signaled with the "interface connection" green led, while a failed connection is signaled with the "communication error" led.

Once a supported device is found, the software automatically reads all the data related to the remote configuration, as well as the frequencies that are pre-programmed.

Firstly, in order to avoid unwanted operation, no parameters can be changes and the EDIT button, presents on the bottom of **Device** panel, is yellow and set to LOCKED state. Pushing the EDIT button, it becomes grey and sets to UNLOCKED state to indicate that the configurations can be modified.

In this panel it's possible to assign a name to the TX (not available for FW v.1.22.0F or previous). Under this parameter, there is a flag to hide the info menu on the TX (not available for FW v.1.22.0F or previous)

CURRENT SETTINGS PANEL

In the Current Settings panel the user can

- with Preset panel → load one of the 10 available configurations
- with other panels → modify all the configuration's parameters (the same that are changeable in the OLED display). Each parameter can be locked or hidden clicking the related lock/hidden button, so the set value cannot be changed next or cannot be visible on the OLED display.

ATTENTION: All the modifies applied to the Current Settings panel are instantaneous: they are applied directly to the device and save in its memory but no saved in the preset configuration.

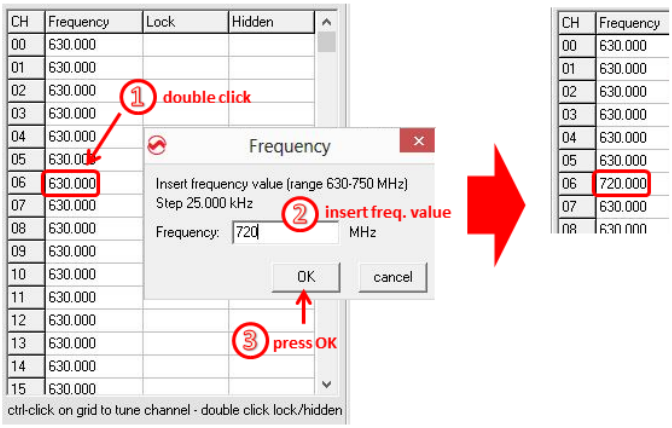
TUNING FREQUENCIES PANEL

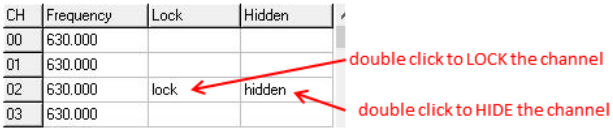
With the Tuning Frequencies panel the user can select a frequencies group (0÷39) and for each one execute the following operations:

- modify the Group's Name
- lock and/or hidden the group
- for each channel (0 ÷59) of the selected group: change the frequency value and the related status (locked/hidden) (in the center grid frequency)

The SAVE button, at the top of the panel, save the changes of the group selected (name group, lock/hidden group).

To change a frequency value for a specific channel: double click on the grid frequency panel (row=channel's number), insert the new frequency value and press OK button.

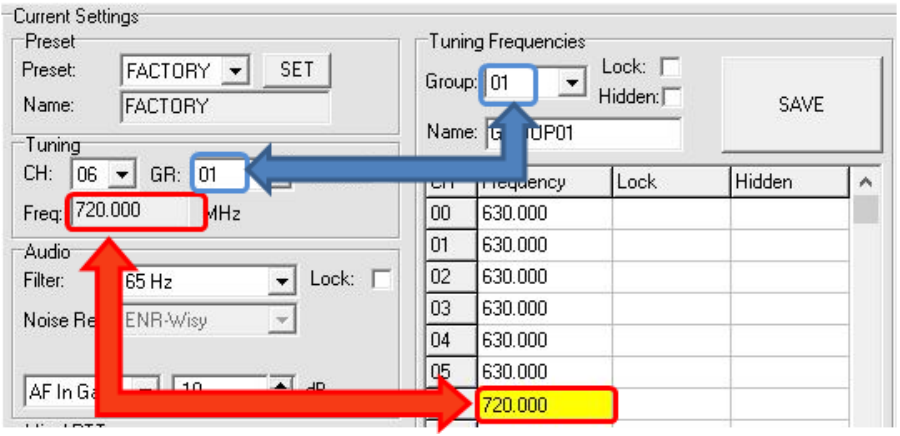




To lock/hide a specific channel, double click on the grid frequency panel.

NOTE: keeping pressed the CTRL button on the keyboard and clicking the wanted channel/group shown on the frequencies grid, the tuning process is executed. It is equivalent to configure the Tuning in the Current Settings panel but it is easier. The device is re-tuned immediately, so be sure that the RF power is turned off while changing frequencies with other RF systems in use around you!

If the currently tuned channel is on the same group that is listed on the grid, the background color of the related cell (channel) on the grid becomes yellow.



Using the LOAD/SAVE button, at the bottom of the panel, it is possible to **load/save** the frequencies for the selected group from/to a .wdf file. To save the frequencies of all the groups click to the related button above. The legacy option save the channels without the hidden/lock info.

PRESETS PANEL

The Preset panel allows to manage all the 10s available configurations.
For each configuration it is possible to set the name and all the parameters value except for FACTORY and USER configurations (see table below).

PRESETS:	NAME*	LOCK/DON'T CARE	PARAMETERS VALUE
FACTORY			
USER			√
OTHERS	√	√	√

√=change is allowed

* Be careful to write a meaningful name for the preset because the name will appear on the settings list of the device menu! Please, avoid empty names.

If a parameter is "locked", it cannot be modified by device menu (using OLED display), while if "don't care" propriety is active, when the user load the configuration, the parameter's value doesn't changed.

ATTENTION: Changes are applied only after a "save" action.
NOTE: *"a trick"* In case of the user have a locked parameter and he is in great need for modify it, he can save the configuration to USER configuration by OLED (see PRESET menu) and then load the USER configuration (in this way all the parameters have the lock propriety disable and the user can modify all the parameters).

FILE MENU

Using a file menu at the top left of the panel it is possible to **load/save all the configuration** values of the device to/from a .wcf file (Wisycom Configuration File).

Save a .wcf file

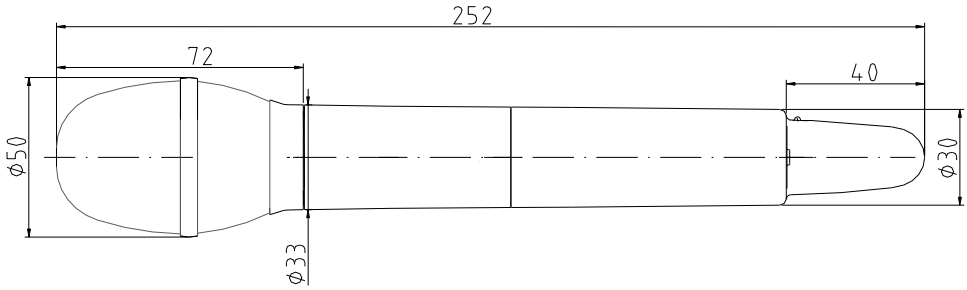
With an infrared device correctly connected, select File->Save User Configuration and select the destination file.

Load a .wcf file

To load a user configuration select File->Load User Configuration and select a previously saved data file; a form will be shown, where it's possible to select which data has to be restored and which skipped. This allow the user to load a particular configuration while keeping other data.

TECHNICAL SPECIFICATIONS

Switchable channels	2400 allocated by 40 groups of 60 channels (in specific frequency range), quickly selectable with dedicated buttons
Switching window	Up to 232 MHz, depending on band (see below code table)
Frequencies	Quartz PLL frequency synthesizer circuit (25 kHz step)
Frequency stability	▪ ± 2,5 ppm (in the rated temperature range)
Temperature range	-10 ÷ +55 °C
Max RF power	▪ 10mW (ERP) (to respect some local norm) ▪ 50 mW (ERP) (note: in some countries middle power can be disabled, for local norm!) ▪ 100 mW (ERP) (note: in some countries high power can be disabled, for local norm!)
Spurious emissions	< 2 nW
Modulation	wideband FM with pre-emphasis
Nominal deviation	±40 kHz (Peak deviation = ±56 kHz)
Telemetry feature	MTH400 transmits also a digitally modulated sub-carrier, suitable for: ▪ *tone-squelch operating* ▪ *remote battery monitoring* ▪ *optional PTT (push to talk) operation*
AF input connection	Directly interchangeable microphone-heads
AF input level	-60 ÷ +0 dBu nominal, quickly settable by steps of 1 dB with dedicated buttons
Max. input level	+6 dBu
Max sound pressure	150 dB SPL (0,5% THD), with MCM301/MCM302/MCM303/MCM304/MCM305 condenser-heads
Noise-Reduction	ENR (Wisycom Extended-NR), with independent Attack- and Recovery-time, noise optimized ENC (Wisycom Extended-NC), with independent Attack- and Recovery-time, voice optimized & with reduced pre-emphasis
AF bandwidth	45 Hz ÷ 21 KHz (3dB) 55 Hz ÷ 20 KHz (1dB)
Distortion	< 0.3 % (0.15 % typ.)
Signal-to-noise ratio	typ. 115 dB $(A)_{rms}$ with 40kHz deviation typ. 121 dB $(A)_{rms}$ with 56kHz deviation
Led	Led indication with bicolor led (red & green) on wireless power switch: ▪ Wireless transmission status: *GREEN* on/off ▪ Modulation peek (if activated): *RED* ▪ Battery lifetime status: *GREEN* - steady (> 25%) - slowly blinking (< 25%) - quickly blinking (<12%) ▪ Ptt status: *RED* if active
Display	High contrast OLED (Organic light-emitting diode) display (96 x 36 pixels) 8 step battery lifetime indication: 7 bars (100%-87%-75%-63-50%-38%-25%) and "empty bar" quickly blinking (12% remaining)
Power supply	2 AA size cell (Alkaline, rechargeable NiMH)
MTH400 Battery life (2AA alkaline)	▪ approx. 14 hours @ 10mW continuous working ▪ approx. 10 hours @ 50mW continuous working ▪ approx. 7 hours @ 100mW continuous working
Dimensions	⇒ body max. diameter 33 mm (without microphone-head) ⇒ total length 183 mm (without microphone-head)
Weight	Approx. 300g, including battery and MCM3xx (condenser) mic-head (approx. 260g batteries excluded)



Note: unit is mm

POWER PROFILE & COUNTRY FREQUENCY RANGE:

EU max power 50mW (Europe)
0W1 / **EUX** max power 100mW (Europe)
US max power 50mW, limited to 698MHz (USA & Canada)
JP max power 10mW, limited to 714MHz (Japan)
NZ max power 100mW, limited to the range 502÷698MHz (New Zealand)

VARIANTS:

▪ **COLOR**

P body color titanium gray (ceramic coating)
B body color black (powder coating)

▪ **FREQUENCY RANGE**

1 470-640 MHz
2 566-798 MHz
3 510-698 MHz

For the commercial code, see in the Variants area of the Products on our website

Compliance

Model	*In Compliance with*	*Max Power*	*Country*
MTH400 **MTH400-EU**	**EN 301 489-1/-9** **EN 600065** **EN 300 422-1/-2**	50mW	Europe CE
MTH400-0W1 **MTH400-EUX**	**EN 301 489-1/-9** **EN 600065** **EN 300 422-1/-2** **EN 300 454-1/-2**	100mW*	Europe CE
MTH400-US	FC PART 74 FCC-ID: **POUMTH400** **RSS-123, RSS-102** IC: **11967A-MTH400** Limited to 698MHz	50mW	USA, Canada
MTH400-JP	R **202-LSC058** Limited to 714 MHz MIC marking identifier can be found in the battery compartment.	10mW	Japan
MTH400-NZ	**EN 300 422-1/-2** **EN 300 454-1/-2** Limited to the range 502÷698MHz	100mW	New Zealand

***** MTH400-0W1/MTH400-EUX is not an SRD device, it requires specific authorization by your local frequency authority!

Note: The above technical specifications refer to the MTH 400 "transmitter" section. The acoustic specs are relevant to the microphone-head used. The MTH 400 transmitter complies with ETSI 300 422.

Before putting the device into operation, please observe the respective country-specific regulations!

MANUFACTURER DECLARATIONS

In compliance with the following requirements

- RoHS Directive (2002/95/EC)

- WEEE Directive (2002/96/EC)

Please dispose of the diversity transmitter at the end of its operational lifetime by taking it to your local collection point or recycling center for such equipment

- Battery Directive (2006/66/EC)

The supplier batteries or rechargeable batteries can be recycled. Please dispose of them as special waste or return them to your specialist dealer. In order to protect the environment, only dispose of exhausted batteries.

FCC Conformity

This device complies with Part 74 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operations.

Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC ID can be found near the battery compartment (unscrew & slide down the cover).

FCC ID: POUMTH400

Industry Canada Conformity

EN

This device complies with Industry Canada RSS-123. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

FR

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio RSS-123. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

ITALY ONLY

Obblighi di informazione agli utilizzatori

ai sensi dell'art. 13 del Decreto Legislativo 25 luglio 2005, n. 151 "Attuazione delle Direttive 2002/95/CE, 2002/96/CE e 2003/108/CE, relative alla riduzione dell'uso di sostanze pericolose nelle apparecchiature elettriche ed elettroniche, nonché allo smaltimento dei rifiuti"

Smaltimento di apparecchiature elettriche ed elettroniche di tipo professionale

Il simbolo del cassonetto barrato riportato sull'apparecchiatura o sulla sua confezione indica che il prodotto alla fine della propria vita utile deve essere raccolto separatamente dagli altri rifiuti.

La raccolta differenziata della presente apparecchiatura giunta a fine vita è organizzata e gestita dal produttore. L'utente che vorrà disfarsi della presente apparecchiatura dovrà quindi contattare il produttore e seguire il sistema che questo ha adottato per consentire la raccolta separata dell'apparecchiatura giunta a fine vita.

L'adeguata raccolta differenziata per l'avvio successivo dell'apparecchiatura dismessa al riciclaggio, al trattamento e allo smaltimento ambientalmente compatibile contribuisce ad evitare possibili effetti negativi sull'ambiente e sulla salute e favorisce il reimpiego e/o riciclo dei materiali di cui è composta l'apparecchiatura.

Lo smaltimento abusivo del prodotto da parte del detentore comporta l'applicazione delle sanzioni amministrative previste dalla normativa vigente.

Smaltimento batterie usate

Questo prodotto può contenere batterie. Questo simbolo apposto sulle batterie significa che non possono essere smaltite insieme a normali rifiuti domestici, bensì devono essere depositate negli appositi punti di raccolta delle batterie.

Iscrizione al Registro A.E.E. n. IT09100000006319

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DECLARATION OF CONFORMITY

DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY

Il sottoscritto, rappresentante il seguente costruttore
The undersigned, representative of the following manufacturer

WISYCOM S.r.l.
via Spin, 156 - 36060 Romano d'Ezzelino (VI) - Italy

DICHIARA che l'apparecchiatura descritta in appresso:
DECLARES that the product:

Descrizione *Description*	Handheld trasmitter
Modello *Model*	Mth400

è conforme alle disposizioni legislative che traspongono le seguenti direttive:
- **direttiva 2004/108 CE (Direttiva EMC)**
- **direttiva 2006/95 CE (Direttiva Bassa Tensione)**
- **direttiva 99/5 CEE (Direttiva Apparecchiature Radio)**

is in accordance with the following Directives:
- *2004/108 EC Directive (EMC Directive)*
- *2006/95 EC Directive (Low Voltage Directive)*
- *99/5 EEC (Radio Equipment Directive)*

e che sono state applicate tutte le norme e/o specifiche tecniche di seguito indicate
and that all the following standards have been applied

EN 60065:2002 + A1:2006 + A11:2008 + A2:2010 + A12:2011

EN 301 489-1 V1.9.2

EN 301 489-9 V1.4.1

EN 300 422-2 V1.3.1

Luogo *Place*	Romano D'Ezzelino
Data *Date*	25 July 2012
Firma *Sign* (nome e funzione) *(name and title)*	Franco Maestrelli WISYCOM s.r.l. Franco Maestrelli Amministratore Unico

WisyCom®

Wireless System Communications

Via Spin 156 • I-36060 Romano d'Ezzelino • Italy
Tel. +39 -0424 -382605 • Fax +39 - 0424 - 382733
www.wisycom.com • e-mail: sales@wisycom.com