

# ME-TUN

*A Professional FM Tuner*



## USER'S MANUAL

*ME-TUN Manual E; march 2004*

e-mail: [mail@mediaengineering.com](mailto:mail@mediaengineering.com)

web:

[www.mediaengineering.com](http://www.mediaengineering.com)

[www.me-tun.com](http://www.me-tun.com)

[www.fm-spy.com](http://www.fm-spy.com)



MEDIA ENGINEERING wants to thank you for selecting this MEDIA ENGINEERING product. For optimum performance and installation we recommend to read the following instructions carefully. In case of difficulties please contact one of our distributors or the manufacturing company.

Manufacturers address: **MEDIA ENGINEERING**  
Markus Stocker  
Rainstrasse 15  
**CH - 8104 WEININGEN (ZH)**  
Switzerland

Phone : +41-1-750-66-88  
Fax : +41-1-750-66-91  
E-mail : [mail@mediaengineering.com](mailto:mail@mediaengineering.com)  
Web : [www.mediaengineering.com](http://www.mediaengineering.com)

The information in this documentation is subject to change. While every effort has been made to eliminate errors, MEDIA ENGINEERING disclaims liability for errors or for difficulties arising from interpretation of the information contained herein.

MEDIA ENGINEERING makes no representations or warranties whatsoever with respect to the content of this document and specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. MEDIA ENGINEERING reserves the right to make alterations as technical progress may warrant at the discretion of MEDIA ENGINEERING. MEDIA ENGINEERING has no obligation to notify any person or entity of any changes and/or revisions to this publication. MEDIA ENGINEERING reserves the right to change materials and specifications without notice.

#### COPYRIGHT © MEDIA ENGINEERING

All information contained in this documentation is the property of MEDIA ENGINEERING and is proprietary to MEDIA ENGINEERING and a trade secret of MEDIA ENGINEERING.

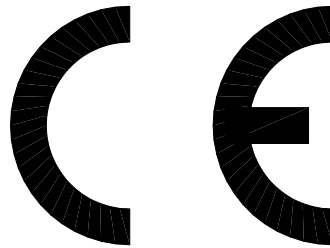
No part of this publication may be copied, reproduced, transmitted, stored in a retrieval system, or translated into any language, in any form or by any means without the prior written consent of MEDIA ENGINEERING, Markus Stocker, CH-8104 Weiningen (ZH), Switzerland, [mail@mediaengineering.com](mailto:mail@mediaengineering.com)



**MEDIA ENGINEERING**  
Markus Stocker  
Rainstrasse 15  
**CH - 8104 WEININGEN (ZH)**  
Switzerland

Phone : +41 1 750 66 88  
Fax : +41 1 750 66 91  
E-mail : [mail@mediaengineering.com](mailto:mail@mediaengineering.com)

## EC Declaration of Conformity



MEDIA ENGINEERING Markus Stocker, located in Rainstrasse 15, CH-8104 WEININGEN (ZH), Switzerland, hereby declare under our full responsibility that the product designated by "Professional FM Tuner ME-TUN" consisting of one 19"/1RU rack mountable device in its original metal housing conforms to the following standards:

Standards used: EN 55022 : 1998 + A1 : 2000  
EN 55024 : 1998 + A1 : 2001  
FCC PART 15

Test center: EMC-TESTCENTER ZÜRICH AG  
Schaffhauserstrasse 580  
CH-8052 ZÜRICH  
[www.emc-testcenter.com](http://www.emc-testcenter.com)

Test report: EMC 094 / 02 dated 30/12/2002

All conformity tests have been made when the product is installed according to professional practice in a Recording or Broadcasting studio or similar environment. This product must not be used outside the specified environment.

Weiningen: january, 10th, 2002

  
\_\_\_\_\_  
Markus Stocker  
President & CEO MEDIA ENGINEERING



## CONTENT

<b>A. INSTALLATION INSTRUCTIONS</b> .....	<b>5</b>
<b>A.1. SAFETY CONDITIONS</b> .....	<b>5</b>
A.1.1. ELECTROMAGNETICAL INTERFERENCE .....	6
A.1.2. ENVIRONMENT TEMPERATURE .....	6
A.1.3. CAUTION WITH THE MAINS CABLE .....	6
A.1.4. DO NOT REMOVE COVER .....	6
<b>A.2. INSTALLATION PROCEDURE</b> .....	<b>7</b>
<b>A.3. SETTING THE SAMPLING RATE FOR THE DIGITAL AUDIO OUTPUT</b> .....	<b>8</b>
<b>A.4. CABLING</b> .....	<b>11</b>
<b>B. OPERATING INSTRUCTIONS</b> .....	<b>12</b>
<b>B.1. BASIC OPERATIONS</b> .....	<b>12</b>
B.1.1. STARTUP SEQUENCE .....	12
B.1.2. LIT UP KEYS .....	12
B.1.3. THE INITIAL STATE .....	13
B.1.4. TUNING IN TO A SPECIFIC FREQUENCY .....	14
B.1.5. SAVING A PRESET .....	15
B.1.6. LOADING A PRESET .....	16
B.1.7. SETTING THE INFO MODE .....	17
B.1.8. HEADPHONES VOLUME CONTROL .....	18
<b>B.2. EXTENDED OPERATIONS</b> .....	<b>19</b>
B.2.1. MENU FUNCTIONS .....	19
B.2.2. STEPPING THROUGH PRESETS .....	20
B.2.3. FINE TUNING .....	21
B.2.4. LOCKING THE TUNER .....	22
B.2.5. SCANNING THE FM CHANNELS .....	23
B.2.6. SELECTING THE ANTENNA INPUT .....	25
<b>C. PINOUT OF 25 PIN D-TYPE CONNECTOR ON THE REAR SIDE</b> .....	<b>26</b>
<b>D. EXAMPLE OF HOW TO USE THE AUXILIARY INTERFACE</b> .....	<b>27</b>
<b>E. SUMMARY OF KEYBOARD COMMANDS</b> .....	<b>28</b>
<b>F. TECHNICAL SPECIFICATIONS</b> .....	<b>29</b>



## A. INSTALLATION INSTRUCTIONS

### A.1. SAFETY CONDITIONS

After removing any housing parts and electronic assemblies it's possible to get access to live parts. It's essential to ensure that the subsequent safety rules are strictly observed:

**S**ervicing of electronic equipment must be performed by qualified personnel only.

**B**efore removing covers the equipment has to be switched off and the mains cable unplugged.

**W**hen the equipment is open power supply capacitors have to be discharged with the help of a suitable resistor.

**W**hen the equipment is open components, that carry heavy electrical loads, such as power transistors and resistors as well as solenoid coils should not be touched before a cooling off interval, as a precaution to avoid burns.

**D**uring servicing unprotected and operating equipment never touch bare wires or circuitry.

**D**uring servicing unprotected and operating equipment use insulated tools only.

**D**uring servicing unprotected and operating equipment never touch metal semiconductor cases because they may carry high voltages.

**F**or removing and installing electronic components, please follow the recommendations concerning the handling of MOS components.



#### A.1.1. ELECTROMAGNETICAL INTERFERENCE

In case the ME-TUN is installed and operated in a strongly electromagnetic disturbed environment, signals of interferences can occur during reception of the FM Band.

#### A.1.2. ENVIRONMENT TEMPERATURE

Preferably install the equipment in a dry location with approximately 20 centigrades (room temperature) of ambient temperature. The ambient temperature has a large influence on the contrast of the LCD display.

#### A.1.3. CAUTION WITH THE MAINS CABLE

Always seize the mains cable at the plug. Do not pull on the cable and never touch the mains cable with wet hands, since this can cause a short-circuit or an electrical shock. Do not place equipment or a furniture on the mains cable. A damaged mains cable can cause fire or an electrical shock. Therefore examine the mains cable occasionally. Should it be damaged, get in contact with your next customer service in order to replace the cable.

#### A.1.4. DO NOT REMOVE COVER

To prevent electric shock, do not remove the cover. There are no user serviceable parts inside the ME-TUN. Refer servicing to qualified service personnel only.



## A.2. INSTALLATION PROCEDURE

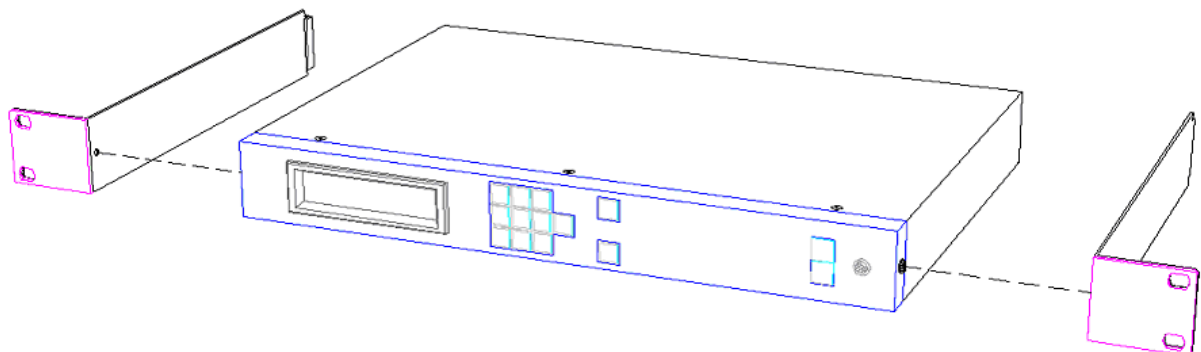
Place the ME-TUN professional FM tuner in a horizontal position, and do not place anything heavy on it. Never bring a magnet or magnetized objects near the tuner, because such will adversely affect the performance of the ME-TUN.

Should it be necessary to change the sampling rate of the digital audio output to another value than the factory set 48kHz please refer to chapter A3.

In case the ME-TUN has to be installed in a 19" rack the appropriate 19" brackets have to be mounted first in order to convert the table top device into a rack mountable device:

- a) loosen the two black M4 screws on the left and right side of the ME-TUN with the help of an appropriate 2.5mm PHILIPS screw driver
- b) put the two screws beside for they will be used again at the end
- c) unpack the two blue 19" brackets that are delivered as an add-on to every ME-TUN
- d) with a little movement from back to forward the brackets can be hooked into place while the U-shaped end of the bracket is grabbing around the end of the side wall.
- e) carefully replace the M4 screws from the left hand side resp. from the right hand side and tighten them slightly ("two finger" torque)

It's a good rule of practice to mount at least a 19"/1RU blank panel on top and below each 19" rack mountable device. The same is true for the ME-TUN and - whenever possible - a blank panel above and below each ME-TUN should be mounted.



**ME-TUN with demounted 19" brackets (front view)**



### A.3. SETTING THE SAMPLING RATE FOR THE DIGITAL AUDIO OUTPUT

The AES/EBU digital audio output on the rear side of the ME-TUN is featuring a sampling rate of 48kHz. This sampling rate is factory set and marked on the rear panel as such.

In case this is not the propre sampling rate for a given application it's possible to choose one of three other values:

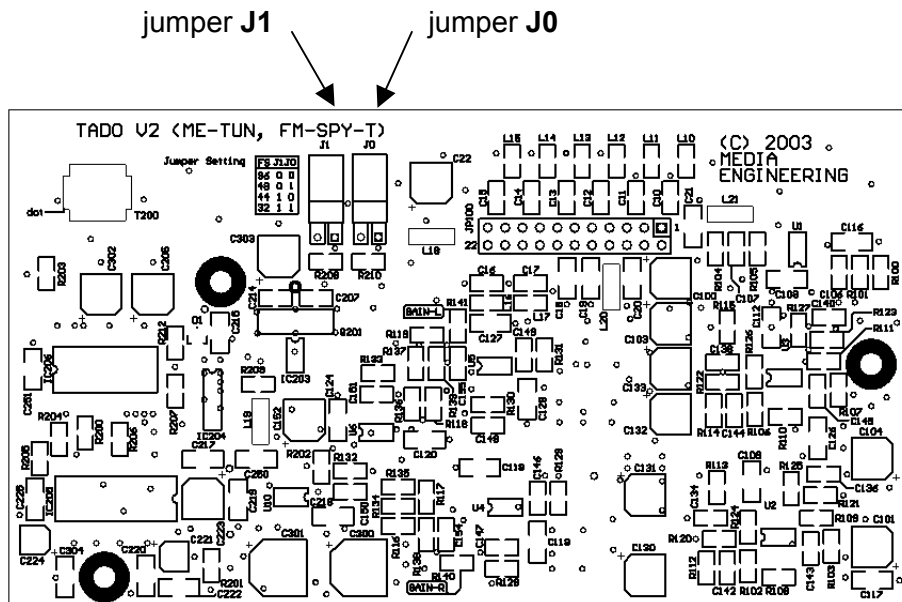
- **32 kHz**
- **44.1 kHz**
- **48 kHz**
- **96 kHz**

In order to change the sampling rate one needs to change the setting of two jumpers which are located inside the ME-TUN. Please refer to the procedure as described herewith:

1. Carefully study the SAFETY CONDITIONS in chapter A.1. on page 5
2. disconnect all cables from the ME-TUN. Make shure there is no power line connected anymore and the power switch is off.
3. loosen the three black M3 screws on the top front of the ME-TUN with the help of an appropriate 2.0mm PHILIPS screw driver in order to remove the cover.
4. put the three screws beside for they will be used again at the end
5. shift the cover 10mm to the rear and lift it off
6. locate the output amplifier board (called TADOBOARD, 72mm x 132mm) at the very back totally to the right.
7. loosen the three black M3 screws holding down the output amplifier board with the help of an appropriate 2.0mm PHILIPS screw driver
8. put the three screws beside for they will be used again at the end
9. with gentle force and a slight left to right rocking unplug and remove the board in a straight vertical direction



10. locate the two jumpers J1 and J0 according to the PCB layout drawing:



11. choose the new sampling rate and select the proper jumper setting:

fs	J1	J0
96 kHz	0	0
48kHz	0	1
44.1 kHz	1	0
32kHz	1	1

J1

J0

The table indicates the jumper settings as follows:

- "0" indicates that no jumper has to be set
- "1" indicates that a jumper has to be set

example:            in order to set a sampling rate of 48kHz (which is the factory setting) do not set a jumper at the left position J1 but set a jumper on the right position J0

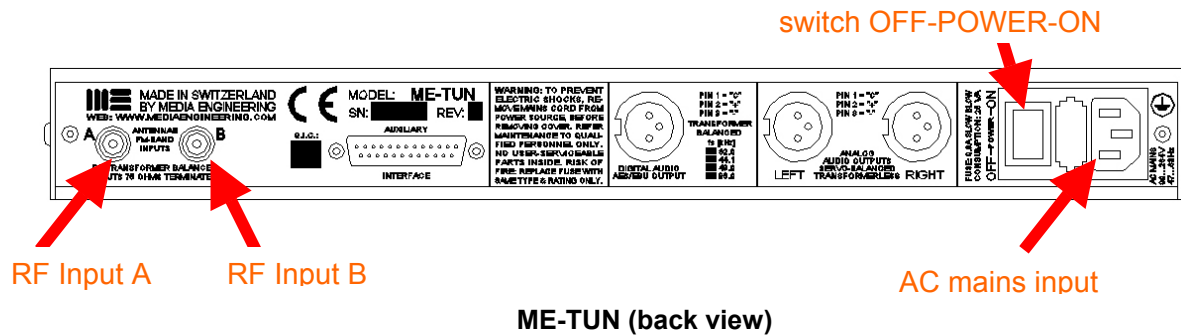


12. put the output amplifier board back into the ME-TUN. Make shure the 22pin connector fits right into the socket underneath the cutout in the metallic shielding. The board is placed perfectly if there shows up an air gap between the board and the side wall of the ME-TUN of approximately 0.5mm
13. put in place the three black M3 screws in order to hold down the output amplifier board. Make shure the propre screws with the half sperical head are used
14. tighten the crews slightly (“two finger” torque) with the help of an appropriate 2.0mm PHILIPS screw driver. DO NOT USE STRENGTH.
15. replace the cover of the ME-TUN in a vertical motion so that there remains an air gap of approximately 10mm in the front section
16. shift the cover 10mm into the front direction in order to allow the bended shielding at the back grabing the U shaped rear side.
17. put in place the three black M3 screws in order to hold down the cover. Make shure the propre screws are used so that they can be lowered into the cover in order to achieve a totally flat surface.
18. reinstall the ME-TUN.
19. check your application with the new setting of the sampling rate. If it doesn't work properly one of the following problems might have occurred:
  - ⇒ the output amplifier boards 22pin connector is not properly connected to the socket and there is not a 0.5mm air gap on the right side of the board. Solution: go back to point 11.
  - ⇒ the jumper setting is wrong. Solution: go back to point 10 and make shure that a “0” indicates no jumper but a “1” indicates a jumper. J1 is the left and J0 is the right jumper.
  - ⇒ the jumper setting is not matching the features of your external device (e.g. a mixing console). Solution: check if your external device is able to handle one of the four selectable sampling rates and then choose one of these.



## A.4. CABLING

Connect an antenna cable to the “*RF Input A*” or “*RF Input B*” socket of the ME-TUN. These inputs are featuring F-type connectors (female chassis receptacles) with 75Ω impedance.



A matching coaxial antenna cable is needed. Contact your ME-TUN dealer for advice on a suitable cable to use. In case of using 75Ω antenna cables with IEC type of connectors two adapters F-IEC are supplied with every ME-TUN.

Both antennae inputs are DC-free decoupled with RF transformers. This means the antennae inputs are completely earth-free; they are not having a connection to the chassis or to earth via the power cord. This decoupling prevents that the potential of the antenna cable (which is very seldom earth) is short-circuited with the earth supplied by the power supply, for this were leading to compensation currents which in turn is the most often reason for hum problems on the analog audio outputs.

The ME-TUN has two transformerless servo balanced analog audio outputs (left & right channel) and a transformer coupled digital audio output (AES/EBU digital audio) on its rear side via standard XLR connectors. A headphones output connector (standard 1/4" Jack) on the front side is also provided. Only attach appropriate audio monitoring devices to these outputs of the ME-TUN.

Connect the AC Mains Lead to the “*AC mains input*” socket of the ME-TUN. Caution: wrong handling may cause electric shocks (see A.1.3.: CAUTION WITH THE MAINS CABLE on page 6/22).

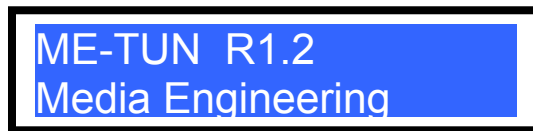


## B. OPERATING INSTRUCTIONS

### B.1. BASIC OPERATIONS

#### B.1.1. STARTUP SEQUENCE

After proper installation of the ME-TUN (refer to A.2. INSTALLATION PROCEDURE on page 7), flip the “OFF-POWER-ON” switch on the rear side to the “ON” resp. upper position in order to start up the device. Upon power on, ME-TUN enters the initialization sequence and displays the firmware version information on its LCD display (screen 1).



screen 1

Simultaneously all keys on the keypad will light up briefly<sup>1</sup>. A few seconds later, ME-TUN will enter the INITIAL state (refer to section B.1.3: INITIAL STATE on page 13)

#### B.1.2. LIT UP KEYS

ME-TUN has quite a large number of keys, but is nevertheless operated very simply. **Only the lit up keys react on user input.** No matter in what position of the input sequence the operator is, the ME-TUN will light up only those keys, which are meaningful for the next keystroke.

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

keypad 1: INITIAL STATE

“keypad 1” shows an example: The keyboard is ready for user input on keys 1,8,9,LOAD or SAVE. All other keys are disabled and have no function. Thus, ME-TUN will guide you through the required steps to set up the tuner as desired.

<sup>1</sup> This serves as a test for the LED illuminated push-buttons.



### B.1.3. THE INITIAL STATE

ME-TUN is memoryzing its settings during power-off and will - upon power up - display and tune to the frequency that was received just before power was lost or switched off. This frequency will be displayed in the top left position of the display after the startup sequence as shown in “screen 2”.



**screen 2**

Approximately in the middle of the top row of the LCD display the FM channel mode can be read out which is either "mono" or "stereo".

On the top right of the display there is featured an antenna symbol plus the letters ‘A’ or ‘B’ in order to indicate the actual antenna input in use.

The lower half of the LCD display is showing one out of three possible information lines (described in B.1.7.: SETTING THE INFO MODE on page 17).

When the ME-TUN is in its INITIAL state the keypad will be lit up as already presented in “keypad 1” on page 12.

Important note: ME-TUN resets and starts an internal timer each time a push-button is activated. If an input sequence is not finished within a few seconds, ME-TUN will automatically “fall back” to its INITIAL state. This feature is particularly convenient if there’s happening a mistake during inputting a command, for a “clear” or “reset” button is not necessary. One simply waits approximately 3 seconds and the keyboard “falls back” to the INITIAL state.



B.1.4. TUNING IN TO A SPECIFIC FREQUENCY

When the tuner is powered up and waits in the INITIAL state (refer to section B.1.3: INITIAL STATE on page 13), the desired frequency, e.g. 103.250 MHz, may be inputted directly. There is no need to step through menu functions in order to get to a tuning menu. Under the condition, that the antenna input in use is already set properly (otherwise refer to B.2.6.: SELECTING THE ANTENNA INPUT on page 25) one can tune to any frequency within the entire FM band starting from the INITIAL state in predefined steps of 25kHz.

As the FM band extends from 87.500 MHz to 108.000 MHz, the buttons that can be activated in first place are 8/9 or 1 corresponding to the first digit of the desired frequency. In case of inputting 103.250MHz, this would be a 1 and the screen and keypad looks like this:



screen 3

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

keypad 2: AFTER INPUTTING "1"

The only lit up button on the keypad now is button 0. This invites the user to press that button as the next one, as there is no valid frequency starting with a 1 followed by a digit other than 0. After pressing 0 one might continue to input the remaining digits, namely 3-2-5.

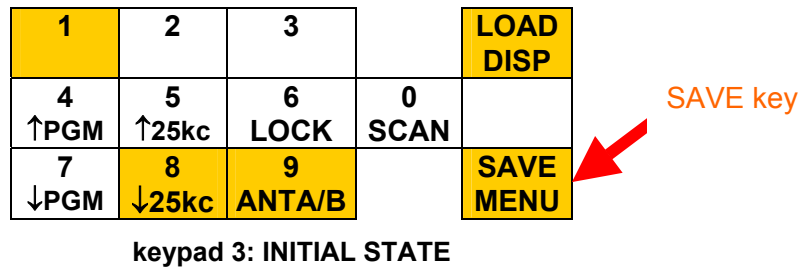
The previously mentioned "fall back" feature (refer to section B.1.3: INITIAL STATE on the bottom of page 13) of the keyboard forces the user to do inputs within a given time interval.

After inputting the second last digit (5), it's not needed to input the last digit (0) for ME-TUN will always set the last digit automatically. As a summary: the entire sequence for the frequency in question is: 1-0-3-2-5 to tune to 103.250MHz out of the INITIAL state.



B.1.5. SAVING A PRESET

Out of the INITIAL state of ME-TUN (refer to section B.1.3: INITIAL STATE on page 13), press the SAVE/MENU button once (the arrow in keypad 3 points to the SAVE key),



whereupon “screen 4” will appear on the LCD display and the ME-TUN will ask for a preset number, in order to know where to save the preset. Preset numbers between 00 and 39 are allowed in order to save

- the actual RF receiving frequency
- the actual used antenna input A or B



screen 4

After inputting the two preset number digits, ME-TUN will automatically fall back to its INITIAL state (refer to section B.1.3: INITIAL STATE on page 13).



B.1.6. LOADING A PRESET

Loading (restoring) a preset is similar to saving one. On the keypad the LOAD button (the arrow in keypad 4 points to the LOAD key) plus a 2-digit preset number to load (between 00 and 39) has to be keyed in.

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

LOAD key

keypad 4: INITIAL STATE



screen 5

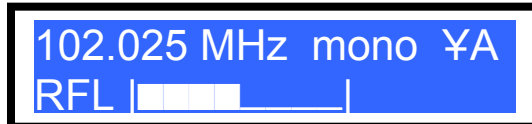
After inputting the two preset number digits, ME-TUN will fall back automatically to the INITIAL state (refer to section B.1.3: INITIAL STATE on page 13).



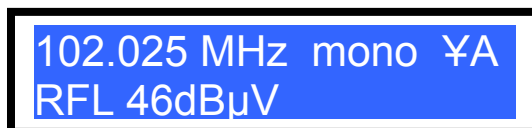
B.1.7. SETTING THE INFO MODE

The bottom row of the LCD display is featuring one out of three possible info modes:

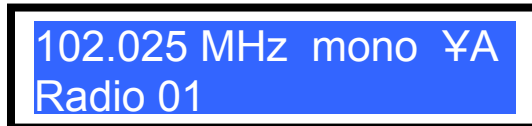
1. **RFL** (Radio Frequency Level) in a **bargraph** presentation indicating the strength of the antenna signal (at the RF antenna input in use).



2. **RFL** (Radio Frequency Level) in a numerical representation in "**dBµV**" (the reference level is 1µV what equals 0dBµV, e.g. 46dBµV = 200µV)

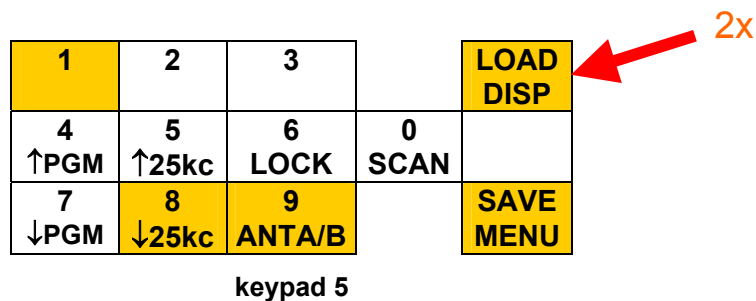


3. **RDS** data of the *PSNS code* (program service name segment)



If the actually tuned in station is not broadcasting any RDS information the LCD displays bottom line remains blank (blue).

Activating the LOAD button twice is stepping through all three info modes:

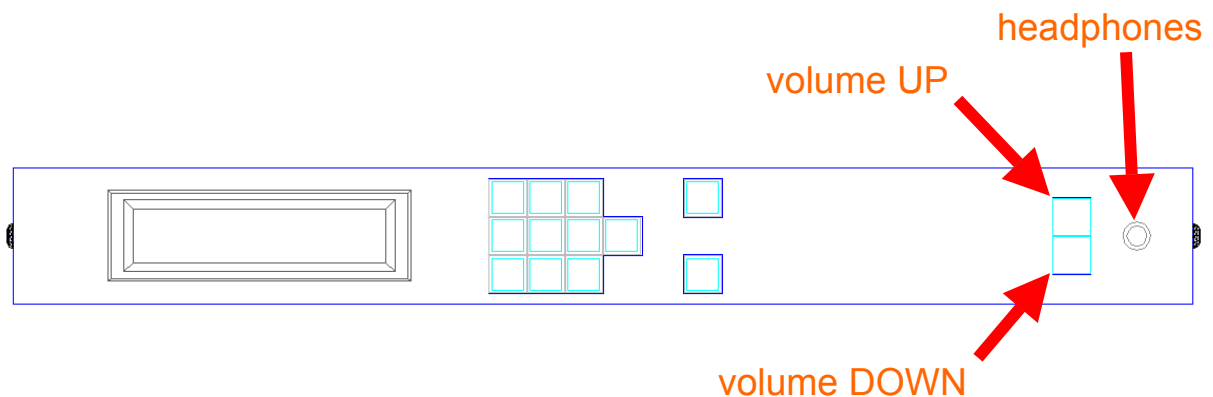


After each double-press of the LOAD button, the channel info mode changes its state.



### B.1.8. HEADPHONES VOLUME CONTROL

On the front side of the ME-TUN there is totally to the right side the headphones connector. This is a standard ¼" Jack as very widely used for headphones worldwide.



There are two push-buttons to the left of the headphones connector. These are serving for the headphones volume control in a highly sophisticated microprocessor controlled manner:

- after powering up the ME-TUN both push-buttons are illuminated. This is signalling that the volume control is in its “normal” (default) position. This position is equal to approximately 12dB below maximum volume.
- shortly pressing onto one of the buttons is increasing resp. decreasing the headphones volume by 1dB. When the volume ends up to be BELOW the default value the lower button (DOWN) is illuminated and when it's ABOVE the default value the upper button is illuminated.
- pressing one of the buttons for more than approximately 1 second leads to a volume-jump of 1dB and - after this - to a fine fading up resp. down (until eventually the maximum at 0dB or the minimum at -42dB is achieved)
- pressing briefly onto both buttons simultaneously is forcing the volume to jump to its lowest possible value (approximately 42dB below maximum volume)
- pressing onto both buttons simultaneously for more than approximately 1 second lets the volume first jump to its minimum value (-42dB) and then up to its “normal” default value (12dB below maximum)



**B.2. EXTENDED OPERATIONS**

**B.2.1. MENU FUNCTIONS**

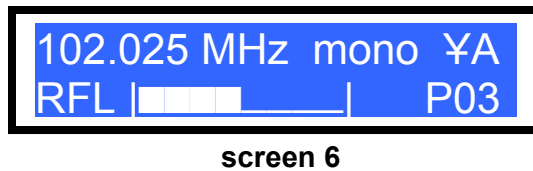
Some special features are accessible through MENU functions. The MENU is activated by a double-press on the SAVE/MENU button out of the INITIAL state (refer to section B.1.3: INITIAL STATE on page 13).

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

2x

**keypad 6: INITIAL STATE**

A double-press of the SAVE/MENU button is switching to the MENU functions and the LCD display of the ME-TUN will look like “screen 6”.



The actual loaded preset number (which must not necessarily contain the same frequency as is shown in the top row) is displayed in the bottom row at the right hand side.

The illumination pattern of the keypad is now looking like “keypad 7”:

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

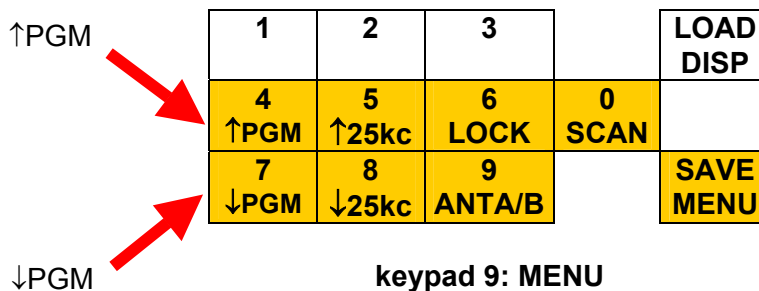
**keypad 7: MENU**



During using MENU functions the automatic “fall back to INITIAL state” feature of the ME-TUN is still active. After a certain time without any user input, ME-TUN will quit the MENU state and fall back to the INITIAL state (refer to section B.1.3: INITIAL STATE on page 13). When pressing the SAVE key from the MENU state, ME-TUN will be switched back to INITIAL state, too.

B.2.2. STEPPING THROUGH PRESETS

One can load a preset (as described in section B.1.6. LOADING A PRESET on page 16) by pressing the LOAD button and entering the desired 2-digit preset number. In case it's unknown where to find a given preset in the memory, it's possible to step through all presets by pressing the ↑PGM and ↓PGM keys for in-crementing rsp. de-crementing the preset number out of the MENU state (refer to section B.2.1. MENU FUNCTIONS on page 19).



During stepping the actual preset number can always be monitored on the LCD display. The ME-TUN has a preset memory with preset numbers ranging from 00 to 39. It's possible to step up and down only within this range of memory addresses.

While in MENU state and the button ↑PGM or ↓PGM is activated ME-TUN is not falling back anymore. The activation of any one of these buttons is stopping the fall back mechanism and lets the user step conveniently through all presets (stepping up or stepping down). Even a fine tuning in 25kHz steps with buttons ↑25kc or ↓25kc is possible without falling back to the INITIAL state. An activation of any other lit-on button triggers the desired function and starts the fall back routine again.



B.2.3. FINE TUNING

By entering the MENU state and using the push-buttons  $\uparrow$ 25kc or  $\downarrow$ 25kc on the keypad, one can alter the FM receivers tuning frequency in 25kHz steps up or down.

25kHz step up

1	2	3		LOAD DISP
4 $\uparrow$ PGM	5 $\uparrow$ 25kc	6 LOCK	0 SCAN	
7 $\downarrow$ PGM	8 $\downarrow$ 25kc	9 ANTA/B		SAVE MENU

25kHz step down

keypad 10: MENU

When pressing one of these buttons continuously, the stepping will be faster. The frequency range of the receiver (87.5MHz to 108.0MHz) can not be exceeded and the stepping will be stopped before going out of band.



B.2.4. LOCKING THE TUNER

In order to prevent the ME-TUN from unwanted manipulations, it's possible to activate the "LOCK" feature. This is done in the MENU state (refer to section B.2.1. MENU FUNCTIONS on page 19) and using the LOCK button (see "keypad 11").

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

keypad 11

The entire sequence to lock the ME-TUN is: MENU-MENU-LOCK. As soon as the LOCK button is activated, the following screen and keypad lightmap will appear:



screen 7

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

keypad 12: LOCKED!

By pressing the same push-button sequence MENU-MENU-LOCK within a proper time-interval (to prevent fall back after approximately 3 seconds) will unlock the ME-TUN. (Note: this is the identical key sequence as is used to lock the ME-TUN out of the INITIAL state (refer to section B.1.3: INITIAL STATE on page 13)).



B.2.5. SCANNING THE FM CHANNELS

The automatic FM channel scanning function of the ME-TUN is a useful feature when the device has been installed in a new location with entirely different radio sound broadcasting stations as at the previous location. When enabling the automatic scanning function, ME-TUN scans the FM frequency band from 108.000MHz downwards to 87.500MHz and stores all channels with strong enough RF levels (the threshold is set to 50dBµV) to its internal memory.

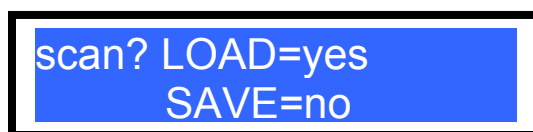
The channels are stored in a reverse order to the internal memory: The first channel ME-TUN finds will be saved to program number 39, the second one to program number 38 and so on. As the user of ME-TUN will normally have his favourite channels stored in the first few preset positions (e.g. preset 00 to preset 08), the scanning function will not overwrite the user channel setup when storing all channels which were found during scanning to the last positions in memory.

In order to start a scan, the MENU state of the ME-TUN has to be achieved by double-pressing LOAD/MENU and then the SCAN button (see keypad 13) has to be pressed:

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

keypad 13: MENU

Because scanning might overwrite some previously stored presets in the internal memory, ME-TUN will prompt you before continueing (see screen 12).



screen 8



By pressing the LOAD button ME-TUN will effectively start the scanning function. During scanning, there will show up a backlight sequence of the LED illuminated push-buttons (simulating a tuning wheel rotating counter clock wise) and the tuning frequency will be decreased in 100kHz steps starting from 108.000MHz. Also shown is the actual preset number that ME-TUN will use to store a channel.



**screen 9**

When ME-TUN finds a strong enough channel (the threshold is set to 50dB $\mu$ V) the center key "5" on the keypad will light up briefly and the preset number on the LCD display will be decremented by 1. After reaching the bottom end of the FM band (87.500MHz), ME-TUN will show the number of stations that have been found and saved during the scan.



**screen 10**

By hitting the LOAD button ME-TUN will load the last station it has found (in case of "05 programs found" this is preset number 35) and returns to its INITIAL state (refer to section B.1.3: INITIAL STATE on page 13).


In order to check which programs ME-TUN has found during scanning, the "stepping through presets" function (as described in chapter B.2.2. STEPPING THROUGH PRESETS on page 20) can be used.



### B.2.6. SELECTING THE ANTENNA INPUT

To change the antenna input in use, enter the MENU state (refer to B.2.1.: MENU FUNCTIONS on page 19) and press button ANTA/B on the keypad.

1	2	3		LOAD DISP
4 ↑PGM	5 ↑25kc	6 LOCK	0 SCAN	
7 ↓PGM	8 ↓25kc	9 ANTA/B		SAVE MENU

keypad 8: MENU  ANT A/B

After pressing this key, ME-TUN will toggle the antenna input from A→B or from B→A, depending on the previous selection of the antenna input.

Note: ME-TUN is featuring two antenna inputs for there are situations in which it's necessary to monitor not only radio stations that can be received with the help of an aerial (e.g. an antenna on the roof) but also the ones coming in via CATV (CABLE TV network).

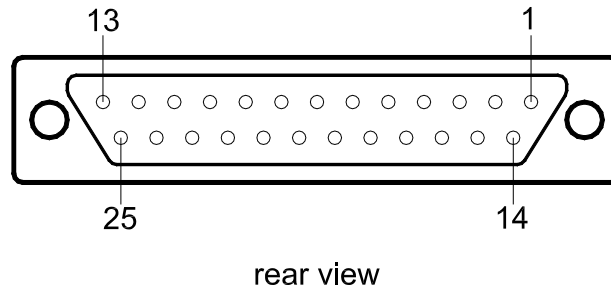
The feature is also helpful when a directional antenna is used in order to receive a certain station with a nondistorted or strong enough RF signal. In this case an omni-directional antenna (probably a ground plane connected to the second antenna input) might be used to receive the other stations of the FM band.

\* \* \*



## C. PINOUT OF 25 PIN D-TYPE CONNECTOR ON THE REAR SIDE

The 25pin D-type connector AUXILIARY INTERFACE on the rear side of the ME-TUN is a female chassis type receptacle. While looking onto the connector from the rear the pinout of this connector is as follows:

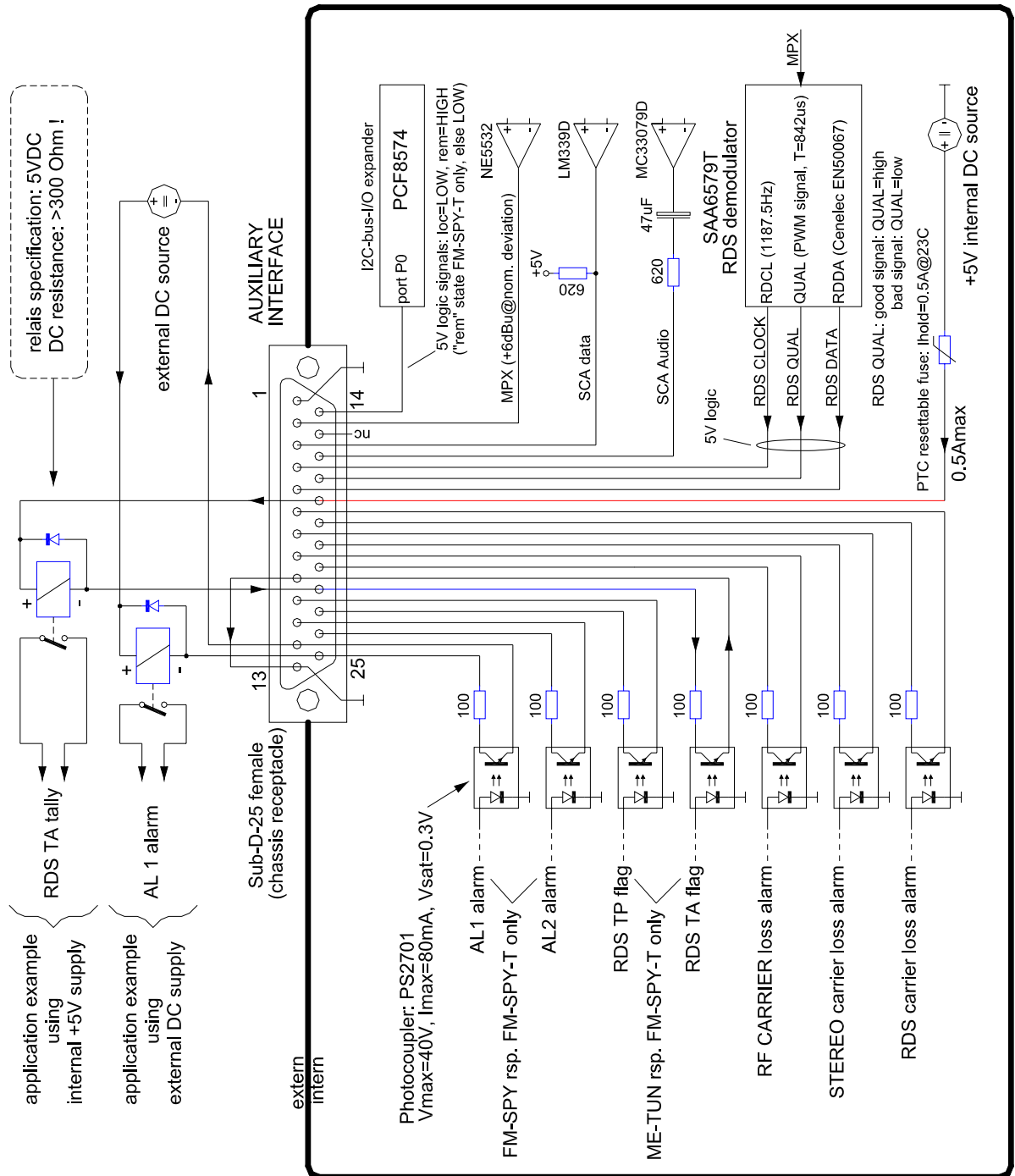


PIN #	Signal / Description
1	Gnd (Chassis)
2	MPX-OUT (+5.5...+6.5dBu @ nom dev.@600Ω)
3	SCADATA
4	RDSCLOCK (1187.5Hz)
5	RDSDATA (according to <i>CENELEC EN 50067</i> )
6	Opto1 Emitter (RDS loss alarm)
7	Opto2 Emitter (STEREO loss alarm)
8	Opto3 Emitter (CARRIER loss alarm)
9	Opto4 Emitter (TA flag)
10	Opto5 Emitter (TP flag)
11	for future use
12	for future use
13	Gnd (Chassis)
14	0V/5V binary signal: local=LOW/remote=HIGH
15	not connected
16	SCAAUDIO
17	RDSQUAL (PWM signal: T=842μs, good=HIGH, bad=LOW)
18	+5VDC, PTC fused ( $I_{hold}=0.5A@23^{\circ}C$ )
19	Opto1 Collector (RDS loss alarm)
20	Opto2 Collector (STEREO loss alarm)
21	Opto3 Collector (CARRIER loss alarm)
22	Opto4 Collector (TA flag)
23	Opto5 Collector (TP flag)
24	for future use
25	for future use



### D. EXAMPLE OF HOW TO USE THE AUXILIARY INTERFACE

The schematic diagram represents the internal circuitry of the ME-TUN in regard of the AUXILIARY INTERFACE. Also two application examples are shown: the implementation of relais coupled switching outputs with the use of an internal resp. external DC source.





**E. SUMMARY OF KEYBOARD COMMANDS**

1 <sup>st</sup> keystroke	2 <sup>nd</sup> keystroke	3 <sup>rd</sup> keystroke	4 <sup>th</sup> keystroke	5 <sup>th</sup> keystroke	6 <sup>th</sup> keystroke
------------------------------	------------------------------	------------------------------	------------------------------	------------------------------	------------------------------

TUNING to 103.250 MHz:

<b>1</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>5</b>
----------	----------	----------	----------	----------

SAVING PRESET NO. 27:

<b>SAVE</b>	<b>2</b>	<b>7</b>
-------------	----------	----------

LOADING PRESET NO. 19:

<b>LOAD</b>	<b>1</b>	<b>9</b>
-------------	----------	----------

SEQUENCING THE INFO MODE:

<b>DISP</b>	<b>DISP</b>
-------------	-------------

STEPPING UP THROUGH PRESETS:

<b>MENU</b>	<b>MENU</b>	<b>↑PGM</b>	<b>↑PGM</b>	.....
-------------	-------------	-------------	-------------	-------

STEPPING DOWN THROUGH PRESETS:

<b>MENU</b>	<b>MENU</b>	<b>↓PGM</b>	<b>↓PGM</b>	.....
-------------	-------------	-------------	-------------	-------

FINE TUNING IN 25kHz STEPS UPWARDS:

<b>MENU</b>	<b>MENU</b>	<b>↑25kc</b>	<b>↑25kc</b>	.....
-------------	-------------	--------------	--------------	-------

FINE TUNING IN 25kHz STEPS DOWNWARDS:

<b>MENU</b>	<b>MENU</b>	<b>↓25kc</b>	<b>↓25kc</b>	.....
-------------	-------------	--------------	--------------	-------

LOCKING THE ME-TUN:

<b>MENU</b>	<b>MENU</b>	<b>LOCK</b>
-------------	-------------	-------------

UNLOCKING THE ME-TUN:

<b>MENU</b>	<b>MENU</b>	<b>LOCK</b>
-------------	-------------	-------------

SCANNING :

<b>MENU</b>	<b>MENU</b>	<b>SCAN</b>	<b>LOAD</b>	.....	<b>LOAD</b>
-------------	-------------	-------------	-------------	-------	-------------

SELECTING (TOGGLING) THE ANTENNA INPUT :

<b>MENU</b>	<b>MENU</b>	<b>ANTA/B</b>
-------------	-------------	---------------



## F. TECHNICAL SPECIFICATIONS

### ANTENNAE INPUTS

number of antennae inputs .....	2
antenna input impedance .....	75 $\Omega$
antenna input connector type.....	F (receptacle)
antenna input circuit.....	transformer balanced earthfree
antenna selecting switch: .....	the unused input is 75 $\Omega$ terminated

### FM RECEIVER

receiving frequency range .....	87.500MHz - 108.000MHz
receiving frequency step width .....	25kHz
sensitivity .....	5 $\mu$ V @ 30dB <sub>SINAD</sub>
intermodulation .....	5mV (73dB) suppression
scanning threshold RF signal strength .....	50dB $\mu$ V
carrier loss threshold RF signal strength .....	25dB $\mu$ V
number of presets .....	40

### ALARM OUTPUTS

connector type .....	D-Sub, 25 pin, female chassis receptacle
alarm outputs .....	5 photocouplers
specification photocouplers .....	$U_{CEmax} = 40V / I_{Cmax} = 80mA / U_{CEsat} = 0.3V$
DC supply output .....	+5.0 VDC, stabilized
resettable fused DC supply output .....	PTC, $I_{hold} = 0.5A @ 23^{\circ}C$

### POWER SUPPLY

mains power voltage .....	90 - 250 VAC
mains power line frequency .....	47 - 63 Hz
power consumption .....	< 25 Watt

### PHYSICAL DIMENSIONS

width x depth x height .....	380 x 260 x 44 mm
weight .....	4.5 kg

### INCLUDED ACCESSORIES:

- 1 pcs. power cord, 3wire
- 2 pcs. antenna connection adapter type "F-male"  $\leftrightarrow$  "IEC-male"
- 2 pcs. 19"/1RU rack mount kit
- 1 pcs. user's manual