

# APM

## User manual & Installation guide

Digital paging microphone





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# Introduction

## Digital paging microphone

The APM1xx series are digital paging microphones which are available in different models with different numbers of freely programmable function / zone selection buttons, from 1 up to 16. They are designed to be used in combination with various types of audio equipment, including matrix systems (both analogue and digital) and relay units.

Depending on the device the APM is connected to, the configuration can be programmed allowing standard functions such as zone select, push-to-talk or relay activation, while advanced function such as voice-file playback are also possible.

An internal memory allows storage of voice-file messages, while a compressor/limiter with automatic gain monitors the microphone level and controls the output level of the unit. The functioning of the device and communication is monitored and indicated on the front panel.

The construction is made of solid steel enclosure fitted with a 35 cm electret gooseneck microphone with cardioid pickup characteristic. This guarantees a stable and optimal placement on any desk. Priority based paging is possible when multiple units are connected together.

# Precautions

## READ FOLLOWING INSTRUCTIONS FOR YOUR OWN SAFETY

ALWAYS KEEP THESE INSTRUCTIONS. NEVER THROW THEM AWAY

ALWAYS HANDLE THIS UNIT WITH CARE

HEED ALL WARNINGS

FOLLOW ALL INSTRUCTIONS

NEVER EXPOSE THIS EQUIPMENT TO RAIN, MOISTURE, ANY DRIPPING OR SPLASHING LIQUID.

DO NOT INSTALL THIS UNIT NEAR ANY HEAT SOURCES SUCH AS RADIATORS OR OTHER APPARATUS THAT PRODUCE HEAT

DO NOT PLACE THIS UNIT IN ENVIRONMENTS WHICH CONTAIN HIGH LEVELS OF DUST, HEAT, MOISTURE OR VIBRATION

THIS UNIT IS DEVELOPED FOR INDOOR USE ONLY. DO NOT USE IT OUTDOORS

ONLY USE ATTACHMENTS & ACCESSORIES SPECIFIED BY THE MANUFACTURER

DON'T MAKE OR CHANGE ANY CONNECTIONS WHILE THE UNIT OR ANY ASSOCIATED DEVICES ARE POWERED ON.



### **CAUTION – SERVICING**

This product contains no user serviceable parts. Refer all servicing to qualified service personnel. Do not perform any servicing (unless you are qualified to)



### **EC DECLARATION OF CONFORMITY**

This product conforms to all the essential requirements and further relevant specifications described in following directives: 2004/108/EC (EMC), 2006/95/EC (LVD) and 2011/65/EC (RoHS)



### **WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)**

The WEEE marking indicates that this product should not be disposed with regular household waste at the end of its working life. This regulation is created to prevent any possible harm to the environment or human health.

This product is developed and manufactured with high quality materials and components which can be recycled and/or reused. Please dispose of this product at your local collection point or recycling centre for electrical and electronic waste. Do this to make sure that the product is recycled in an environmental friendly way, and help to protect the environment in which we all live.

## **ADDITIONAL INFORMATION**

This manual is put together with much care and effort and is as complete as could be on the publication date. However, updates on the specifications, functionality or software may have occurred since publication. To obtain the latest version of both manual and software, please visit the Audac website @ [www.audac.eu](http://www.audac.eu).



# Chapter 1

## Overview of APM1xx

The APM1xx range consists of four different models, as following:

**APM101:** Containing 1 single programmable zone/function selection button

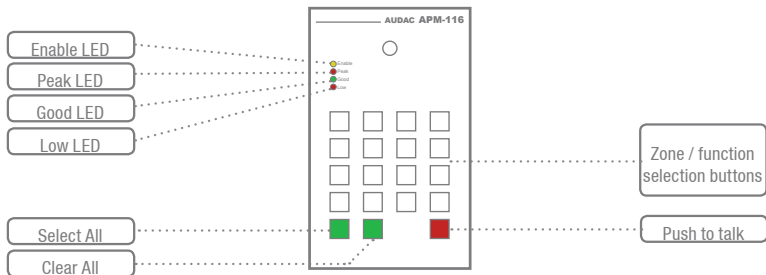
**APM104:** Containing 4 programmable zone/function selection buttons in combination with select / clear all and push-to-talk.

**APM108:** Containing a 4x2 programmable zone/function button matrix in combination with select / clear all and push-to-talk.

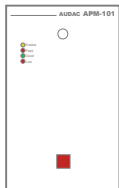
**APM116:** Containing a 4x4 programmable zone/function button matrix in combination with select / clear all and push-to-talk.

All button functions are freely programmable using the software interface of the matrix system. In installations without matrix system, the Audac system manager should be used for configuring.

The below image gives an overview of the keypad of APM paging microphones, indicating the different buttons and indicators. The number of zone / function selection button is depending of the model, indicated in the APM models overview below:



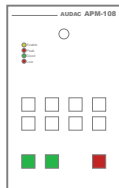
### APM models:



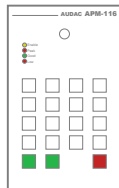
APM101



APM104



APM108



APM116

# Indicator LED functions

The indication LED's on the APM have following functions:

**Enable (orange) LED:** Indicates the operation status of the databus  
Flashes when the chime tone is playing  
Illuminates when the databus is busy (priorairy APM is paging)

**Good (green) LED:** Indicates the correct voice level when speaking  
Illuminating when voice level is OK

**Peak & low (red) LED's:** Indicates incorrect voice level  
Illuminating when voice level is too high (peak) or too low (low)



When powered on, the microphone will automatically run a test procedure to detect any malfunction of the system. In case any malfunction detected, all four indication LED's will start blinking.

# Button functions

## **Programmable zone/function selection buttons:**

Depending on the system or installation, different functions can be assigned to the programmable zone/function selection buttons. The function assignment should be done through the software interface of the matrix system, or using the Audac system manager. (in combination with the APC100 configuration unit)

Functions:

- Zone select:** Press to select/deselect the desired paging zone.  
When selected, the selection button will be illuminated. Announcements will be made to all selected zones.
- Play message:** Playbacks a voice–file message stored from the internal APM memory to the selected zones.

**Push to talk (PTT):** Announcements can be made after the push–to–talk button is pressed.

- Toggle relay:** A relay status will toggle between activated / de-activated when pressed. Both relays integrated in intelligent devices such as matrix systems or relays from separate relay units can be controlled from APM.
- Pulse relay:** A relay will activate when pressed, as long as the button is held. (Press and hold) When released the relay will return back to idle status.
- Layer select (1–3):** Switches between different layers of programming, allowing control of an increased number of zones / functions. (Only available when using APM116)
- Group buttons:** using multiple functions at once, an example of this might be to select a zone and play a messages to that zone.
- Play M2 voice file:** Triggers a voice file stored on the SD card slot of the M2 (only works when connected to an M2 system). Specific settings such as zone assignment and play mode should be configured in M2 voice file settings menu.

### **Standard selection buttons:**

The standard selection buttons are the three buttons on the bottom row of the APM keypad (only for APM104, APM108 and APM116). These buttons are fixed and not configurable.

- Push to talk:      Announcements can be made after the push-to-talk button is pressed. In standard configuration, a chime tone will always be heard prior to any announcement.
- Select all:         Selects all the buttons which are configured as a 'zone select', allowing them to be addressed instantly for announcements. Buttons will illuminate when selected.
- Clear:              De-selects all the buttons which are configured as a 'zone selects'

# Chapter 2

## Quick start guide

This chapter guides you through the setup process for a basic project where an APM1xx paging microphone gets connected to a matrix system or relay unit. Make sure the system power is switched off when connecting.



### ATTENTION

Making or changing any connections while powered—on can lead to permanent damage of the equipment. Make sure the power is switched off while connecting and verify correct connection method before powering on!

Connect the the APM1xx paging microphone to a matrix system or Audac relay unit using cabling CAT (CAT5E for analog systems and CAT6 for digital systems) with a standard cable length of 300 meters. Make sure the APM1xx is connected to the appropriate input (paging or peripheral input connection). If any doubt refer to the user manual the APM is to be connected to.

After the connections are made and verified, the system is ready to be switched—on.

When power is applied to the APM, it is instantly ready for operation. In standard (factory default) mode, a software configuration for use in combination with ARU relay units is pre—loaded. When used in combination with digital systems, a custom configuration needs to be made.

A custom configuration can be made in different ways. The most common way is by using the webinterface of the connected matrix, allowing configuration of the most commonly used functions. Another method is by using the Audac system manager tool, which can be freely downloaded and allows for more complex configurations than those available from the web interfaces. Detailed configuration guides of how the custom configuration should be made, can be found in the instruction manual of the related Matrix or Audac system manager.

After the configuration has been made successfully, the system is ready for operation.

When pressing a zone selection button, the zone will be activated and the corresponding button will illuminate in orange colour. When pressing again, the zone will be deactivated. Multiple (All) zones can be instantly activated by selecting the ‘Select all’ button and can be deactivated by pressing ‘Clear all’.



After the desired zones are activated, announcements can be made by pressing and holding the 'Push to talk' button. When the databus is occupied by another paging station (orange LED blinking), no announcements can be made.

Following actions take place when making an announcements:

- 1) Selection of zones will be transmitted to the main unit and selected zones will be enabled.
- 2) Chime tone (if enabled) will be announced. (the orange led will blink during chime playback)
- 3) The microphone will switch on and the level will be indicated by the indicator LED's. Announcements are best made with a distance of 5 cm between the user and microphone, at a tone which results in illumination of the green (good) LED.
- 4) Release the 'Push to talk' button for terminating the announcement

# Chapter 3

## Connecting the APM

The APM's should be connected to the matrix system or relay units using twisted pair cabling (CAT5E or CAT6, depending of the applied system). The maximum bus length is 300 meters.

The supply voltage is delivered to the APM1xx over the twisted pair CAT cabling, and the voltage at the APM1xx side (receiver end) should be 16 Volts or higher (transmitter side inserts 24 Volts).

### Bus length limits

#### **Analogue:**

- Maximum bus length without application of an ARJ03P with external power supply is limited to 300 meter.
- Maximum bus length with application of ARJ03P with power supply is 600 meter.
- Maximum distance from APM1xx to ARJ03P is 3 meters, should be deducted from total bus length.

## **Digital:**

- Maximum bus length without application of a CP45ARP with external power supply is limited to 300 meter.
- Maximum bus length with application of CP45ARP with power supply is 600 meter.
- Maximum distance from APM1xx to ARJ03P is 3 meters, should be deducted from total bus length.

## **Connected device limits**

- Maximum allowed number of APM1xx's with external power supply can go up to 9 units.
- Maximum allowed number of APM1xx's with any individual data bus can go up to 9 units.

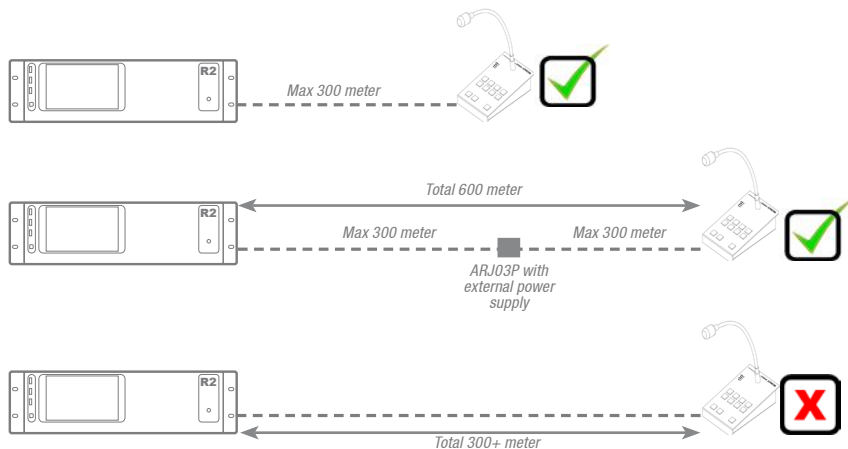
## **Power supply calculation**

The maximum current which can be drawn over the twisted pair cabling is 0.6 Amps. Depending of the number of connected devices junction boxes should be placed in such way, resulting in a current which doesn't exceed this limit. The tables on page 22 shows the maximum current ratings for connectable devices, indicating the maximum cable length in function of connected devices.

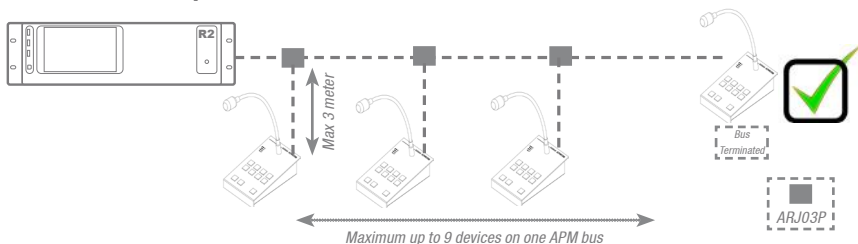
A simplified method allows calculation of the maximum cable length, in function of the number of connected devices:  $L = 300 / X$  (X is the number of connected devices)

# Connection examples

## Connection examples with ONE APM device on one bus



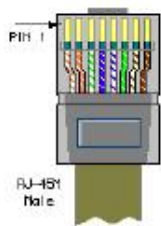
## Connection examples with MULTIPLE APM devices on one bus



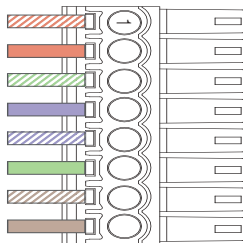
Maximum Current Ratings	
Device	Current rating
APM101 / 104 / 108 / 116	0.3 A
ARU104	0.2 A
ARU108	0.3 A

Maximum Cable length related to the number of APM devices connected to the bus	
Number of APM devices	Maximum Cable length
1	300 meter
2	150 meter
3	75 meter
4	37 meter
5	18 meter

## RJ45 connector pinout (RS485, Analogue / Digital Audio, +24V DC):



<b>Pin 1</b>	White–Orange	Not connected
<b>Pin 2</b>	Orange	Not connected
<b>Pin 3</b>	White–Green	+24V DC
<b>Pin 4</b>	Blue	RS485 A
<b>Pin 5</b>	White–Blue	RS485 B
<b>Pin 6</b>	Green	GND
<b>Pin 7</b>	White–Brown	AUDIO TX A / S+
<b>Pin 8</b>	Brown	AUDIO TX B / S–



# Chapter 4

## Configuring the APM

### Jumper settings:



#### **Analogue / Digital paging selection:**

The APM1xx jumper settings are standard set to be used in combination with digital paging systems. When using them combination with analogue paging systems, the jumper settings should be changed.



#### **Bus Termination:**

The APM1xx's are standard bus termination jumpers are standard set, meaning one single unit to be connected on a databus. When using multiple APM1xx units on one databus, the bus termination settings need to be changed.

## 1) Only one APM on one databus

When only one APM1xx is used on the databus, the databus needs to be terminated by the termination jumper J5 which can be found internally inside the unit's enclosure.

## 2) Multiple APM's on one databus

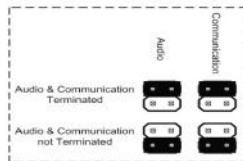
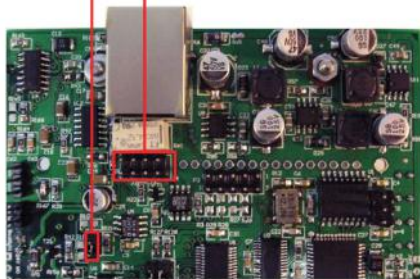
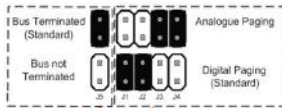
When multiple APM1xx units are daisy chained on one databus, the termination jumper should only be placed on the last junction box (ARJ03P) in the bus structure. Both the audio and communication lines need to be terminated by using these jumpers.

The tables below show which jumpers need to be placed for which application.

Analogue / Digital Paging Selection		
	Digital Paging	Analogue Paging
<b>J1</b>	Placed (Standard)	Open
<b>J2</b>	Placed (Standard)	Open
<b>J3</b>	Open	Placed
<b>J4</b>	Open	Placed

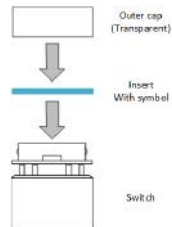
Bus Termination		
	One APM	Multiple APM's
<b>J5</b> (APM)	Placed (Standard)	Open
<b>Audio</b> (ARJ03P)	n/a	Position 1 (Only last one in Chain)
<b>Com</b> (ARJ03P)	n/a	Position 1 (Only last one in Chain)





### Push button labeling:

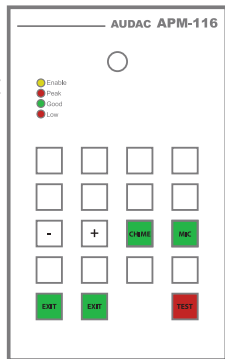
The APM1xx comes delivered with the outer switch caps (transparent) unassembled and separately delivered in its package. This allows simple labeling of the buttons, giving a clear overview of controlled zone(s) or function(s). A template with standard examples can be downloaded from the website [www.audac.eu](http://www.audac.eu). In case project specific labeling is required, custom labeling can be made.



# Service mode

In service mode, both the microphone and chime volume for the APM can get tested and adjusted.

The service mode can be entered by pressing and holding the 'Push to talk' button when powering up the system. When entered service mode, the 'Push to talk' button continuously illuminates in orange colour while the select all, clear all, chime and mic selection button will illuminate in green as indicated in the displayed image.



Following button functions are available in service mode:

**Volume Up:** Pressing this button, the volume (mic or chime) will be increased in steps of 3 dB

**Volume Down:** Pressing this button, the volume (mic or chime) will be decreased in steps of 3dB

**Select mic.:** Pressing this button, microphone volume adjustment mode will be entered

**Select chime:** Pressing this button, chime volume adjustment mode will be entered

After selecting volume adjustment mode (pressing chime or mic) the corresponding volume can be adjusted in steps of 3 dB by pressing the '+' and '-' buttons. Once the volume is adjusted, the current settings can get tested by pressing the 'test' (push to talk) button, whereafter the chime tone will be announced or the microphone will be activated.

After these settings are made correctly, returning to normal operation mode is possible by pressing both 'Exit' buttons (select & clear all) simultaneously.

# Chapter 5

## Technical Specifications

### System specifications:

Microphone	Type	Back electret condenser
Polar Pattern		Cardioid (unidirectional)
Frequency	Response ( $\pm 3$ dB)	100 Hz - 20 kHz
Sensitivity (1W/1m)		-42 dB $\pm$ 3 dB / Pa
Buttons		8 x programmable zone/function 1 x PTT (push-to-talk) 1 x select & clear all
Indicators		3 Colours illuminated push button Level & status indication LED's
Internal storage		10 minutes over max 30 files
Power	Supply	16-24 V DC
Consumption		4.8 W
Microphone	Gooseneck	length 350 mm

Connectors		RJ45 (data + Power)
Connection standard		TIA/EIA T568B
Max. cable length	With external PSU	600 m
	Without external PSU	300 m

## Product Features:

Dimensions	(W x H x D)	120 x 55 x 190 mm
Weight		1.350 kg
Data protocol		RS-485
Audio protocol		Analogue
		Digital
Colours		Grey metallic front panel
Construction		Steel
Required cabling	Analog	≥ UTP CAT5E
	Digital	≥ UTP CAT6

# Notes

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