INSTRUCTION OF
ACTIVE DIGITAL LINEAR MATRICES
TYPE:
ACML1

Model:
ACML1-200/8A
ACML1-260/8A
1. USER NOTES.

- Before you switching to 230V, please read the instruction manual.
- Doing any unknown service to the device by any unauthorized persons makes the depriving of guarantee and can be the cause of the worsening of technical parameters and the safety of using.
- ATTENTION! The device must be powered from a socket with an attached protection circuit (socket with grounding pin).
- When you replacing the fuse, you have to disconnect the plug from the power supply.
- The company reserves the right to make changes in the user manual because of modernization and technical progress without having to enter their in the manual, if they do not change the basic parameters of this product.

Equipment:

- spare fuse
- mounting Brackets
- CD with software

2. BASIC FUNCTIONS

Active Series Digital Linear Matrices ACML1 is specially designed for sound systems in churches, convention facilities, gymnasiums, etc. The characteristics of directional transmission range of each linear array can be adjusted via software (ACML Control) to meet the acoustics of the room. One of the advantages is that there is no need for additional analog devices such as graphic equalizers, limiters, noise gate, because all of these desired effects can be achieved by using the DSP-Processor.

With the change of frequency response bandwidth and delay signals connected to each speaker can change the active matrix parameters such as beam spreading, the direction of emission and the opening angle of the beam. One Array Loudspeaker is able to amplify the areas located as far away as 60 meters from it.

3. OPERATE - using a computer.

All settings can be done using a PC. To be able to use the settings on a computer you need to install ACML Control, which is on the CD. ACML Control Program serves only to set up a computer in a series of columns ACML3.

The Licensor shall not be liable for any type of damages resulting of the program.

The ACML Control is on the CD attached to the purchased column.

Program ACML Control znajduje się na płycie dołączonej do zakupionej kolumny. To install the program on your PC, insert the disc into your CD-ROM drive, run the installation file and follow the instructions that appear.

After installing the program, connect the column to the computer via interface ACML and ACML launch control. Connect the interface to any USB port on your computer.
After launching the program in "Settings" menu, choose "Connect" - open the "Device Settings" with the command "Scan" and choice a selection of the scan range. After scanning all available virtual COM ports on your computer you should set in the "Port Number" to the COM port number at which the ACML1 is working. Check the port number in the "Device Manager" under which COM port the ACML1 is detected. The "Device Manager" can be opened by selecting "Run" in the "Start" menu and then typing "devmgmt.msc". After setting the port and set the range of IP addresses on your ACML1 press the "OK" button to detect all devices.

3.1. BASIC SETTINGS
LIMITER - setting the threshold from -40db to +6dB and choice reaction time (slow, normal, fast).

NOISE GATE - enter the required values in the windows to confirm press Enter or set the value using the slider.

GAIN - the slider to adjust the volume of the column. Hovering the cursor over the slider and turning the knob and "scroll" the mouse to change the gain (+6 dB to-20dB).

DELAY - selected from 0 to 500ms. Adjustment is done by using the slider or by typing the value in the windows (m, cm, ms).

Turning on the noise gate
3.2. SETTING THE BEAM.

COLUMN HEIGHT SUSPENSION - measured from the floor "Acoustic baseline" (Acoustical Reference Line).
FOCUS DISTANCE - in ACML1 columns is defined the optimum distance for 92dB (see Table 1). Active digital ACML1 linear arrays provide a uniform flow throughout the entire listening area. This means that the people who are close to the speaker the sound is not too loud, and the people who stay away not too quiet (sound level difference does not exceed 3 dB).

FOCUS ELEVATION - is closely related with the change of inclination angle of the emitted beam. Changing this parameter is without physically change the position of the column. In practice the height of focus beam is optimally set at 1.5 m. Adjustment is done by using the slider or by entering a value in the window.

OPENING ANGLE - the value of the minimum and maximum opening angle of the emitted beam varies by different models of columns ACML1 (see Table 1, "Technical data"). If the column is more lengthy, the opening angle is smaller. In subjects with very difficult acoustic conditions we set a narrow opening angle of the beam. The wide opening angle of the beam we use when there is a difference in floor height levels in the area.
3.3. EQUALIZER SETTINGS

Help file - user help of the program ACML Control

10-point parametric equalizer

Type of filter
(Peak, LoSh6, LoSh12, HiSh6, HiSh12)

Frequency adjustment
(20Hz - 20kHz)

Gain / damping settings
(-20dB - +12dB)

Hovering the cursor over the slider and turning the knob to "scroll" the mouse, it will change the gain value. You can also enter a value in the windows above and confirm it by pressing ENTER.

Width of the filter
(0.05oct - 3oct)
3.4. CHANGING THE SCENE (GRAPHIC).

In the program Control ACML we can load a scene (the project) of the operated object. This enables a virtual placement of columns ACML in specific areas on which position they are. This scene with the whole group of settings and columns ACML can be saved as a ready-final "PROJECT" on your computer. In this way you can back up all carried Installations.

3.5. CREATING A PROJEKT (Off-line).

Support for ACML Control allows you to create a new project in the off-line mode (without needing connecting between the devices to the network). With this solution, we can make the settings for all matrices by following the instructions in sections 3.1-3.3, and then save the finished project on your computer.
After installing all columns ACML on the object and detect all devices (On-line), we can open it and upload the earlier prepared project. This allows us to save time during installation and sound configuration on the object, because the settings have been introduced earlier to the columns ACML, such as gain, delay, limiter, beam alignment, etc.

3.6. SAVE A PROJECT

3.7. CONNECTING THE MATRICES ACML1 (The method of apprenticeship ACML1).

a) How to connect the columns ACML1 - one transmission line

- Terminating resistor (matching) is activated in the last column ACML (end of line)
b) How to connect the columns ACML1
- two transmission lines, for example left and right sides of the object.

The communication between the Interface ACML and the column ACML1 is based on the standard RS-485 half-duplex. This standard allows you to connect up to 32 columns ACML. The maximum range of the standard for the speed used for ACML (115kb) is 1500m.

The PC, with which we make the settings in the columns ACML1 is connected via cable-USB to the interface ACML. The column ACML is connected with the FTP interface uses Cat5 cable (4 pair cable with shield).

c) Type of mounting connectors RJ-45.

- IN green-white 1
  +IN green 2
  GND orange-white 3
  GND blue 4
  GND blue-white 5
  GND orange 6
  RS-485-Y brown-white 7
  RS-485-Z brown 8

Typical Ethernet cable "straight"

Terminating resistor (matching) is activated in the last column ACML (end of line)
4. BLOCK DIAGRAM OF COLUMNS ACML1.

a) Block diagram of columns ACML1-200/8A

b) Block diagram of columns ACML1-260/8A
5. INSTALLATION METHOD ACML1.

Install the column parallel to the wall without deflecting. You do this by the included top-down handles with vertical and horizontal adjustment.

Connection panel

Double switch:
1: switching ground signal
2: switching terminating resistor (see section 3.7)

Rj45 socket - connection audio cable
Power supply socket
Software version number
Fuse
Adress of this column

Switching signal (terminal RJ-45 or 100V line)
Socket to connect the 100V line
### 6. Technical Data ACML1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ACML1-200/8A</th>
<th>ACML1-260/8A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power [W]</td>
<td>120</td>
<td>160</td>
</tr>
<tr>
<td>Frequency response (+/-3dB)[Hz]</td>
<td>100 (\div) 20k</td>
<td>100 (\div) 20k</td>
</tr>
<tr>
<td>Guaranteed sound pressure at SPL = 95dB (pink noise)</td>
<td>15m (*)</td>
<td>20m (*)</td>
</tr>
<tr>
<td>Number of speakers</td>
<td>16x2.0” + 4HF RIBBON TWEETER</td>
<td>24x2.0” + 4HF RIBBON TWEETER</td>
</tr>
<tr>
<td>Number of DSP channels</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Opening angle in horizontal plane (fixed)</td>
<td>100° (-6dB, 1kHz (\div) 8kHz)</td>
<td>100° (-6dB, 1kHz (\div) 8kHz)</td>
</tr>
<tr>
<td>Opening angle in vertical plane (variable)</td>
<td>6° (\div) 14°</td>
<td>6° (\div) 14°</td>
</tr>
<tr>
<td>Nominal Input Level [dB]</td>
<td>0dB - input line or +50dB - loudsp. input line, 100V</td>
<td>0dB - input line or +50dB - loudsp. input line, 100V</td>
</tr>
<tr>
<td>Input impedance (symmetrical)[k(\Omega)]</td>
<td>15 - input line or 40 - loudsp. input line 100V</td>
<td>15 - input line or 40 - loudsp. input line 100V</td>
</tr>
<tr>
<td>Input gain control[dB]</td>
<td>-20 (\div) + 6</td>
<td>-20 (\div) + 6</td>
</tr>
<tr>
<td>Input delay adjustment [m]</td>
<td>170</td>
<td>170</td>
</tr>
<tr>
<td>Input limiter [dB]</td>
<td>-40 (\div) + 6</td>
<td>-40 (\div) + 6</td>
</tr>
<tr>
<td>Input noise gate</td>
<td>-90dB -3dB - treshold 20us 5000us - attack 1ms 3000ms - release</td>
<td>-90dB -3dB - treshold 20us 5000us - attack 1ms 3000ms - release</td>
</tr>
<tr>
<td>10-point input parametric equalizer</td>
<td>F: 20Hz (\div) 20kHz Bw: 0.05oct. (\div) 3,0oct. G: -12dB (\div) +12dB LoSh6, LoSh12, HiSh6, HiSh12</td>
<td>F: 20Hz (\div) 20kHz Bw: 0.05oct. (\div) 3,0oct. G: -12dB (\div) +12dB LoSh6, LoSh12, HiSh6, HiSh12</td>
</tr>
<tr>
<td>Power amps [W]</td>
<td>8x20W Class D</td>
<td>8x20W Class D</td>
</tr>
<tr>
<td>Power supply [V]</td>
<td>230V lub 115V (50Hz, +/-10%)</td>
<td>230V lub 115V (50Hz, +/-10%)</td>
</tr>
<tr>
<td>Power consumption (standby) [VA]</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Power consumption (max.) [VA]</td>
<td>180</td>
<td>240</td>
</tr>
<tr>
<td>Weight [kg]</td>
<td>9,5</td>
<td>11</td>
</tr>
</tbody>
</table>

(*) opening angle of the sound beam 6
GUARANTEE CARD NO............................

Below mentioned, efficient and in a good condition device is given to the buyer on ..........according to the rules stated in articles no 577-582 of the Penal Code. Rduch Elektroakustyka gives the buyer a guarantee on the proper working device for 36 months.

Name of this device ......................ACML1...........................................................................................................

Rduch Elektroakustyka company, located in Godów, 1 Maja Street 196, tel. (032) 4751803 to 06, fax. (032) 475 18 07, is called a producer in the further part of the contract.

I. OPERATING CONDITIONS

1. Plug – in power socket 230 V /50 Hz should have grounding or neutral grounding.
2. The device should be situated in a place with the temperature between +5ºC to +40ºC and of the humidity between 8 to 80%.
3. The device should not be a subject to vibration, should not be placed near the sources of strong electromagnetic fields and should be protected against the excessive sun exposure.

II. WARRANTY STATEMENTS

1. Warranty period starts from the date of selling the device by the producer.
2. In order to repair the device during the warranty period, it should be delivered to the company after the previous call or fax.
3. The producer provides 7 day repair period counted from the date of the adoption of the device to repair.
4. Requirement for a complaint is to provide the device in the original packing, with the guarantee card, to the place, where the device was bought.
5. In case of the damage of the device during the warranty period, that are caused because of the producer, or hidden defects in the material, the producer reserves the right to exchange the device into another one that is free of defects after having examined the causes of the device malfunction.

III. BEYOND THE WARRANTY

1. The warranty does not cover the mechanical damage or the damage caused by the user, or the damage caused by failure to comply with the universal principles of operation of the equipment and the requirements stated in point no 1.
2. Mechanical damages or other ones, not associated with the operation of the device, result in loss of warranty.
3. Tuning, regulations or the exchange of the fuses are not the subject to the warranty.
4. Producer, as the servicing part, reserves the rights to estimate and qualify the level of the damage.
5. In case of delivering the device in a good condition or the device that was not previously reported, the servicing costs, cleaning, testing and transport costs are paid by the person or the company that complain.
6. The guarantee card is invalid without the producer’s signature, date or the company stamp.

............................................. ..........................................................................................................

Date                                              Stamp and signature

Warranty and post- warranty service

<table>
<thead>
<tr>
<th>Date</th>
<th>Notices</th>
<th>Stamp and serviceman signature</th>
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