

# User Manual

## K24 dp



Version 3.2

18.05.2020

**SEEBURG**  
acoustic line

# 1 Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Contents .....</b>                                     | <b>2</b>  |
| <b>2</b> | <b>Foreword.....</b>                                      | <b>3</b>  |
| <b>3</b> | <b>Safety instructions.....</b>                           | <b>4</b>  |
| <b>4</b> | <b>Connectors/Indicators.....</b>                         | <b>6</b>  |
| 4.1      | Connection panel.....                                     | 6         |
| 4.2      | Connectors .....  | 7         |
| 4.3      | Controls.....   | 8         |
| 4.4      | Status indication.....                                    | 8         |
| <b>5</b> | <b>Operation .....</b>                                    | <b>9</b>  |
| 5.1      | Starting up.....  | 9         |
| 5.2      | Selecting a bank .....                                    | 9         |
| 5.3      | Setting level .....                                       | 10        |
| 5.4      | Recalling presets .....                                   | 10        |
| 5.4.1    | Preset Bank 1 – Default Settings.....                     | 10        |
| 5.5      | Reprogramming of dp-speakers with preset audio files..... | 11        |
| 5.6      | Locking the buttons .....                                 | 11        |
| <b>6</b> | <b>Technical specifications .....</b>                     | <b>12</b> |
| <b>7</b> | <b>Declaration of conformity .....</b>                    | <b>13</b> |

## 2 Foreword

The K24 dp is a premium class high-performance full-range loudspeaker with an integrated digital amplifier providing 2400 Watt + 700 Watt power (AES) and a DSP controller. Various pre-configured presets and volume settings are available for selection. The K24 dp is available in a 60°x50° and a 90°x60° version. The same controller presets apply for both versions.

The integrated DSP controller is based on the same operating principle as the stand-alone controllers HDLM 8 and DSP 2.6. A mere 0.8 ms latency (from analogue input to output) is achieved through the use of a 96 kHz sample rate. The excellent signal to noise ratio is a further feature of the DSP controller. Electronic simulation of a transformer balanced input provides additional protection against hum and buzz caused for example by external interference. High grade electronic components from the industrial sector and first-class circuit design result in a robust device with excellent audio characteristics and minimize disruptive noise.

The default state of the integrated DSP controller is the standard configuration as described in this manual. Custom presets can be installed by the user, but must be programmed with the LPI (Loudspeaker Programming Interface) by the manufacturer. The preset file is a custom audio file which is simply played into the audio input of the controller. In this manner, individual configurations can be created, for instance to accommodate the specific requirements of an installation project. Furthermore, should you ever be unsure as to the integrity of the DSP configuration of your controller, you can obtain a fresh default file from SEEBURG acoustic line and re-install the original factory presets yourself. Efficient and intelligent limiter functions provide optimal protection without sacrificing any of the potential of the system.

If you would like further information about SEEBURG acoustic line products, or have any comments or suggestions regarding this handbook or the product, you can contact us here:

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### 3 Safety instructions



#### **Acoustic**

Even a low input level can result in a sound pressure level at the loudspeaker which can be damaging to your hearing. Do not remain in close proximity to the loudspeaker when it is being operated. Use hearing protection. Observe all relevant Health and Safety and Environmental Protection regulations.



#### **Mechanical**

Movable parts and falling objects during installation and de-rigging can cause serious injury. Observe at all times all relevant Health and Safety regulations and regulations on the installation and operation of PA systems.



#### **Magnetic und electrical**

Loudspeakers generate a magnetic field even without a source of power connected. This can damage or destroy magnetic storage devices. The PowerCon loop-through connector is under power when the device is in operation. Observe all relevant safety regulations at all times.



#### **General safety precautions**

The installation and de-rigging of this equipment should only be carried out by appropriately qualified and experienced personnel, and according to all relevant safety regulations. Find out about the applicable regulations in the country you work in and comply with the respective regulations.

Do not operate the loudspeaker if you have any doubts about the safety of doing so, or if the loudspeaker shows any signs of faulty operation. There are no user serviceable parts inside the device. For repairs, contact your dealer or a qualified service technician.

The loudspeaker is a class 1 device requiring a 230 V / 50 Hz power connection with earth contact.

If the loudspeaker is connected to a power source in which the voltage is too high, a protective mechanism is triggered which reliably safeguards the amplifier module and DSP. Once triggered, the protection must be renewed by a qualified service technician.

Never open the housing. There are no user serviceable parts inside. Do not expose the loudspeaker to rain, and avoid operating in environments below  $-5^{\circ}\text{C}$  or above  $40^{\circ}\text{C}$ . Be aware of the possibility of condensation forming inside the housing due to rapid changes in temperature. Allow the loudspeaker to adjust to ambient temperature before operation. Leave the device switched on if operating in unfavorable conditions.


To prevent overheating, do not operate the loudspeaker in the direct vicinity of strong heat sources, and avoid direct sunlight. After long periods of operation, the loudspeaker, particularly metallic components such as the pole mount and the connector panel, can reach temperatures exceeding  $40^{\circ}\text{C}$ .

## 4 Connectors/Indicators

### 4.1 Connection panel


# K24dp

High Power HiMid System



SEEBURG  
SPEAKERS

Made in Germany  
www.seeburg.com



**Serial No.:**

|                   |  |
|-------------------|--|
| Components        | 2x 12" Nd / 1,4" Nd                                      |
| Input Impedance   | 10 kΩ  |
| Power (max)       | LF: 2400 W HF: 700 W                                     |
| Operation Voltage | Universal Mains 65 - 268V (start voltage auto selection) |
| Maximum SPL       | 140 dB @ 1m  |
| Frequency Range   | 75 Hz - 19 kHz   |
| Tuning Frequency  | 75 Hz  |
| Coverage          | 60° x 50°  |
| Weight            | 37 kg  |

**Caution**

Only use the dedicated hardware to fly the K24dp units

Do not use the integrated flying hardware to link more than three K24dp units

Check proper placements and condition of all connecting parts before rigging


|                              |                            |                                  |
|------------------------------|----------------------------|----------------------------------|
| Status                       | Level                      | Presets                          |
| <input type="radio"/> Mute   | <input type="radio"/> +3dB | <input type="radio"/> Flat       |
| <input type="radio"/> Limit  | <input type="radio"/> 0dB  | <input type="radio"/> MicPre     |
| <input type="radio"/> Signal | <input type="radio"/> -3dB | <input type="radio"/> High Boost |
| <input type="radio"/> Power  | <input type="radio"/> -6dB | <input type="radio"/> Soft       |
|                              |                            | <input type="radio"/> Safe Limit |
|                              |                            | <input type="radio"/> Set 1      |

**PowerCon blue (2)**

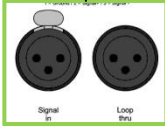
**XLR connectors (1)**

**PowerCon grey (3)**




PowerCon



Signal in

Loop thru



PowerCon

Loop thru

## 4.2 Connectors

### **XLR connectors (1)**

The K24 dp should be connected with a standard symmetrically wired XLR cable. To connect the input signal to further devices, use the male XLR Loop thru connector. To obtain full power performance from the system, the signal source should be able to provide a minimum of 6 dBu distortion free output voltage.

### **PowerCon blue (2)**

Power supply input voltage 110-230 VAC. This connector provides the function of an on-off switch. After powering on (turn the connector to the right until it locks), the systems starts up and is ready for use after approximately 3 seconds. Avoid repeatedly switching the system on and off, particularly when it is operating.

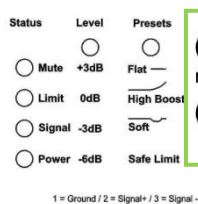
### **PowerCon grey (3)**

110-230 VAC loop-through connector. This connector is to be used when multiple active loudspeakers are to be provided with power from one source. Please observe carefully the maximum power capacity of the power source.



The nominal power consumption of the K24 dp under full power is 2.2 A (measured with pink noise, Crest Factor 8). Transient peaks can, however, cause much higher momentary power drain. Observe carefully the nominal power consumption when connecting the loudspeaker(s) to the power source, and observe carefully the cut-off current of the safety circuit breakers. We recommend using the loudspeaker on power circuits with circuit breakers with C characteristic.

### 4.3 Controls



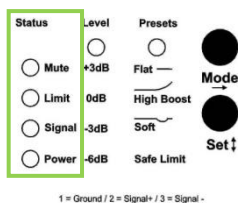
#### **Mode button:**

Switch between the modes Status / Level and Presets.

#### **Set button:**

Set various values and Mute on/off.

### 4.4 Status indication



#### **Mute LED:**

Lights red when the system is muted (press the Set button in Status Mode), or in technically critical conditions.

#### **Limit LED:**

Lights yellow when the limiter is limiting one or more amplifier channels.

#### **Signal LED:**

Lights green when a signal of more than -20 dBu is present. The LED still lights up when the system is muted.

#### **Power LED:**

Lights when the system is powered up.

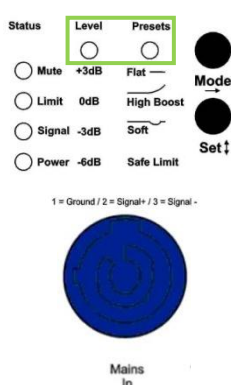


## 5 Operation

### 5.1 Starting up

When the system is switched on, it retains the settings from the previous usage. This also applies to the Bank selection. The system is then in the Status Mode. If the red Mute LED is lit as a result of the previous setting, no signal will be passed. Pressing the Set button once will un-mute the system. The Mute LED will go off, and signal will be passed.

### 5.2 Selecting a bank



The loudspeaker presets are stored in the DSP controller in up to 3 banks. To change banks, press and hold the Mode button whilst the loudspeaker is switched on.

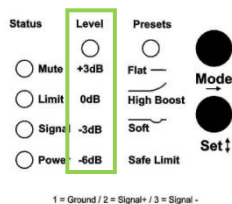
1. Press and hold the Mode button.
2. Connect the power cable (PowerCon blue).
3. Corresponding LEDs blink to indicate the chosen bank.
4. Release the Mode button.

When the power cable is connected, the level and/or preset LED lamps blink to indicate which bank is selected. The level LED blinks to indicate the first bank, the preset LED for the second. The third bank is indicated by both LEDs blinking.

If only one bank is programmed, there is no possibility to switch the bank.

| Bank 1 – Default Settings | Bank 2 | Bank 3 |
|---------------------------|--------|--------|
| Flat                      | -      | -      |
| High-Boost                | -      | -      |
| Soft                      | -      | -      |
| Switchable Safe limit     | -      | -      |

### 5.3 Setting level

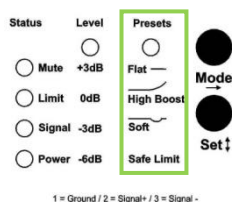


Pressing the Mode button once selects the Level Mode, in which you can adjust the output volume in 3 dB steps. There are four settings available: +3 dB, 0 dB (standard), -3 dB and -6 dB. The setting is done by pressing the Set button. The Level LED lights to indicate which mode is activated. The four vertically aligned LEDs (lit green in this mode) indicate which setting is selected.

### 5.4 Recalling presets

Pressing the Mode button twice selects the Preset Mode. Three different presets with an each switchable Safe Limit mode are available in each bank for selection via the Set button. The four vertically aligned LEDs indicate the current selection. The Safe Limit mode is activated in the preset when the bottom of the four vertical LEDs lights up.

#### 5.4.1 Preset Bank 1 – Default Settings



##### Flat:

Preset for single application or in combination with a subwoofer (e. g. K Sub 1801 dp and K Sub 1801).

##### High Boost:

Based on the preset Flat with a high-frequency boost to improve transparency in a long throw application. The preset is also recommended when using two K24 dp arranged vertically / horizontally next to each other as a single source..

##### Soft:

Flat Preset with additional reduction at around 2,5 kHz.

##### Safe Limit:

Selects more conservative settings for the loudspeaker protection limiter (e.g. for applications without a supervising technician). The Safe Limit function is independent of the selected preset. If the Safe limit function is switched on, the K24 dp is operating in Safe Limit mode, regardless of which preset is selected.

## 5.5 Reprogramming of dp-speakers with preset audio files

By default, the built-in DSP controller is in a default configuration state that conforms to the description in the User Manual. The installation of special presets on the DSP controller can be done by the user himself, since only a special preset audio file must be loaded. The programming of these audio files via the LPI (Loudspeaker Programming Interface) can only be done by the manufacturer.

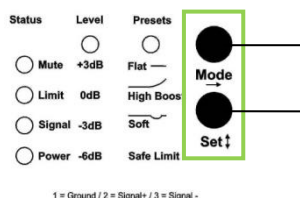
The preset is getting installed on the DSP by playing the preset audio file in the XLR input. This can be done in different ways (MP3 player, smart phone, PC, CD player, ...). Installation via PC is done as follows:

1. Use a mini-jack-XLR (stereo) cable to connect the headphone output to the XLR input of the self-powered box. Use only one of the XLR connectors.
2. Mute the box by pressing the Set button in Status Mode. The Mute LED lights up. The DSP controller can only receive data in the muted state.
3. Make sure your computer's volume is set to 100%.
4. Load the ".wav" file received from SEEBURG acoustic line into a music player.
5. Press the play button.
6. After a successful programming operation, the Mute LED turns off.



It is very important to ensure that the preset audio file is played in single mode. Other music files in the playlist or on the data storage medium will otherwise be played at full volume.

## 5.6 Locking the buttons



Press and hold the Set and Mode buttons simultaneously for more than 3 seconds to lock the controls of the system. Repeat the action to unlock the system.

## 6 Technical specifications

|   |   |
|---|---|
| <b>Speaker Components</b>                   | 2 x 12" Nd / 1,4" Nd  |
| <b>Description</b>                          | High Power HiMid System   |
| <b>Amp Power</b>                            | LF: 2400 W RMS / 110-230 V<br>HF: 700 W RMS / 110-230 V                     |
| <b>Rated Current</b>                        | 2,2 A @ 230 V   |
| <b>SPL (Peak @ 1m)</b>                      | 140 dB  |
| <b>Max. Input Signal</b>                    | 25 dBu  |
| <b>DSP</b>                                  | HDLM FPGA Processing 32 bit floating point                                  |
| <b>AD / DA</b>                              | 24 bit / 96 kHz   |
| <b>Latency</b>                              | 0,8 ms (analog in to analog out)  |
| <b>Usable Range (-6dB)</b>                  | 75 - 19 kHz   |
| <b>Tuning Frequency (excursion minimum)</b> | 85 Hz   |
| <b>X - Overpoint (acoustical)</b>           | depends on preset   |
| <b>Coverage (horizontal / vertical)</b>     | 60° x 50° (60°-version)<br>90° x 50° (90°-version)                          |
| <b>Max. Splay Angle</b>                     | 12°   |
| <b>Connectors</b>                           | Neutrik XLR in/out<br>Neutrik PowerCon in/out                               |
| <b>Handles</b>                              | 2 x   |
| <b>Rigging (flying points)</b>              | 5 x M10 / 4 x 6 mm socket<br>Integrated Flying Hardware<br>35 mm pole mount |
| <b>Weight</b>                               | 37,0 kg<br>(+ 7,0 kg wheelboard)  |
| <b>Size (height x width x depth)</b>        | 70,0 x 42,0 x 46,0 cm   |
| <b>Order No.</b>                            | 01029/dp/60°<br>01029/dp/90°  |

The technical data sheet and further information about possible applications for the system and available accessories can be downloaded at the following Internet address:

[http://www.seeburg.net/download\\_getfile.php?file=downloads/06-Datenblaetter/K-Serie/K24-dp\\_Datenblatt\\_dt.pdf](http://www.seeburg.net/download_getfile.php?file=downloads/06-Datenblaetter/K-Serie/K24-dp_Datenblatt_dt.pdf)

## 7 Declaration of conformity

### *EG Declaration of conformity*

This product

**K24 dp**

confirms to the following EU guidelines, including any additions:

- ✓ 2006/95/EG, Low Voltage
- ✓ 2004/108/EG, Electromagnetic Compatibility
- ✓ (Locations: Appendix 1, Paragraph 1, a and b)

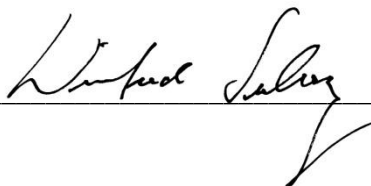
The following standards have been applied:

- ✓ DIN EN 60065
- ✓ DIN EN 55103-1:1996, classes E1 to E4
- ✓ DIN EN 55103-2:1996, classes E1 to E4

Declared by: Winfried Seeburg, SEEBURG acoustic line GmbH

Place and date: Senden, 01.01.2018

Legally binding sign: \_\_\_\_\_



Die Anhänge sind Bestandteil dieser Erklärung. Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der mitgelieferten Produktdokumentationen sind zu beachten.

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## **Benutzerhandbuch / User Manual**

Irrtum bei Beschreibung  
sowie technische  
Änderungen vorbehalten.

Alle SEEBURG acoustic line  
Produkte sind nur für den  
gewerblichen Einsatz bestimmt.

All specifications are  
current at the time of publishing  
but are subject to change.

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