MC16

Mastering Monitor Controller

Content

Version 1.2 – 06/ 2018

Developer: Bastian Neu

This manual includes a description of the product but no guarantee as for specific characteristics or successful results.

Unless stated otherwise, everything herein corresponds to the technical status at the time of delivery of the product and user manual by SPL electronics GmbH.

The design and circuitry are under continuous development and improvement. Technical specifications are subject to change.

Package Contents

MC16 Mastering Monitor Controller

Power cord

Manual

The MC16 Mastering Monitor Controller is available in different colors.

Black: Model 1760

Red: Model 1764

Do consider keeping the original packaging. It can come in very useful whenever you need to transport your gear. If there is ever the need to send it in for repair, the original packaging guarantees a safe shipment.

Product Registration

Register your device to get useful information concerning the product. On the front page of this manual you will find a QR code, which includes the link to the registration form and automatically fills in the serial number and product name into the form. Alternatively you can also call up the online form with your internet browser via the following link: https://spl.audio/register

The centerpiece of your mastering studio

The new MC16 Mastering Monitor Controller – model 1760/1764 is a 16 Channel Mastering Monitor Controller.

Today's mastering studios must be prepared for Dolby Atmos® and Auro 3D® projects. Monitoring up to 16 channels in a quality that is on par with state-of-the-art stereo was hard to achieve – until now.

The new MC16 sports the world's first 16-gang precision potentiometer which was specially designed for SPL.

To seamlessly integrate multi-channel monitoring into a stereo mastering environment we developed a way of pairing the MC16 with our DMC stereo mastering console. The combination of DMC and MC16 allows mastering studios to work in all current audio playback formats at the same quality level, all without reconnecting any speakers.

The MC16 Mastering Console was designed, developed and manufactured in Germany.

Technical Aspects

120 Volt Technology

SPL's goal was to push analog signal processing to the limits. That's why we combined the best possible components with a high-grade optimized circuit design.

We have been using the in-house developed 120-volt technology - the highest-ever operating voltage used for audio applications - in all our products from the Mastering series for years. Some of the most highly respected Mastering studios today revolve around SPL consoles and signal processors from our Mastering series (Bob Ludwigs Gateway Mastering & DVD in the USA, Simon Heyworth's Super Audio Mastering in the UK, Galaxy Studios in Belgium, and the legendary Wisseloord in the Netherlands, for instance).

The 120-volt technology is based on op-amps developed internally by SPL's co-founder and Chief Developer Wolfgang Neumann. The MC16 Mastering Monitor Controller features the most advanced generation of these op-amps. They boast with even better tech specs thanks to the thermal behavior optimization they underwent under the hands of Bastian Neu.
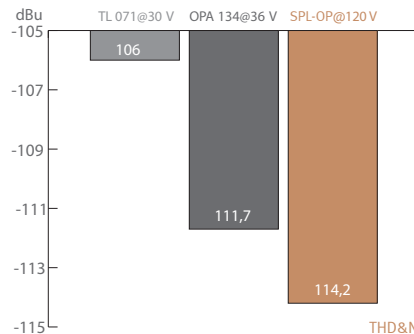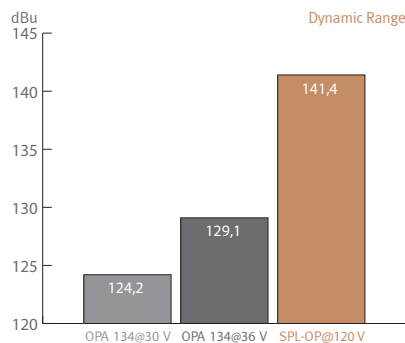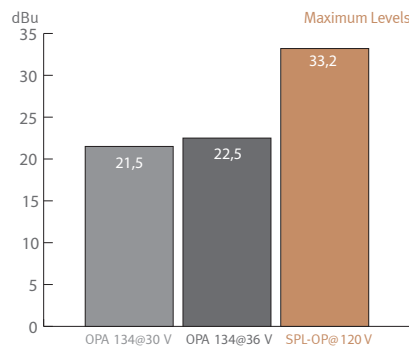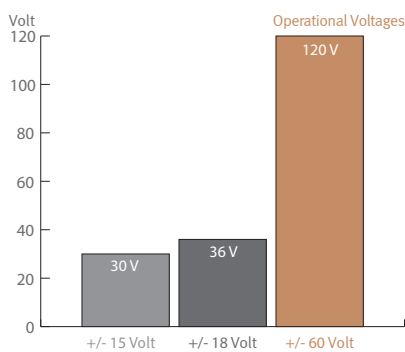
Ultimately, the supply voltage is key for the overall dynamic response of a processor. Voltage is to an electrical circuit what cylinder capacity is to an internal combustion engine:

You can't replace cylinder capacity with anything else, except more cylinder capacity.

120 Volt Technology - Diagrams

These diagrams clearly show the advantages of our 120-volt technology in comparison to other circuits with a lower operating voltage. The direct relation between operating level and maximum level is fundamental for the classification: the higher the operating level, the higher the maximum level a circuit can handle. And since virtually all essential acoustic and musical parameters depend on this relation, a higher operating voltage also has a positive impact on the dynamic range, distortion limit and signal-to-noise ratio. The result is a clearly more laid-back and natural sound with less unpleasant coloring.

Do bear in mind that dB scales do not represent linear but rather exponential increases. A 3 dB increase corresponds to doubling the acoustic power, +6 dB correspond to twice the sound pressure level, and +10 dB correspond to twice the perceived loudness.

Operational Voltages

+/- 15 Volt	+/- 18 Volt	+/- 60 Volt
30 V	36 V	120 V

Maximum Levels

OPA 134@30 V	OPA 134@36 V	SPL-OP@ 120 V
21,5	22,5	33,2

Dynamic Range

OPA 134@30 V	OPA 134@36 V	SPL-OP@120 V
124,2	129,1	141,4

THD&N

TL 071@30 V	OPA 134@36 V	SPL-OP@120 V
106	111,7	114,2

When it comes to volume, the 120-volt technology exhibits a performance that is twice that of common components and circuits, in regard to maximum level and dynamic range, with values that are approximately 10 dB higher. THD measurements of the SPL op-amps show a difference of more than 3 dB compared to the OPA134 at 36 V — in terms of sound pressure level, that corresponds to an improvement of more than 50%.

The operating level most commonly used for audio equipment is 30 volts.

Installation

Voltage Selection

Before connecting the MC16 Mastering Monitor Controller to the mains, make sure that the voltage selection corresponds to the values of your local power grid (230 or 115 volts). Inside the power connector, to the right, next to the on/off switch, there is an opening that displays the voltage selected. If the voltage indicated does not correspond to the one required, change it by following this procedure:

Open the power connector lid with a small screwdriver (use the tiny slots on the right hand side). Use the screwdriver to lever the red fuse holder from above until you can grab it. Take the fuse holder out and replace the fuse with one corresponding to the local power grid specifications. You can find the adequate values on the rear of the unit or on page 15 of this user's manual. Turn the fuse holder around 180 degrees and place it back again. When you close the lid again, you should see the correct voltage displayed in the opening.

On the product site on our website (http://mc16.spl.audio) you will find a video concerning the topic "Changing the mains voltage". If you ever have to exchange a fuse, we recommend the video "Exchange defective fuses".

First Steps

Before turning on the MC16 Mastering Monitor Controller you must first connect the included 3-pin power cord to the 3-pin IEC socket. The transformer, power cord and IEC socket all comply to the VDE, UL and CSA regulations.

The MC16 Mastering Monitor Controller should not be installed in close proximity to equipment that emits magnetic fields or emanates heat. Avoid exposure to heat, moisture, dust, and vibrations. Do not install the MC16 close to any power amps or digital processors. Instead, install it in a fully "analog rack" where any interferences can be avoided (Word Clock, SMPTE, MIDI etc.).

The unit should be powered off before connecting or disconnecting any cables or equipment to it.

Use the On/Off switch on the rear panel to turn the unit on or off. The illuminated red LED on the Monitoring Level Control and the illuminated buttons on the front of the Mastering Monitor Controller MC16 indicate the unit's operating status. The On/Off switch was placed on the rear panel to avoid any emissions due to voltage-carrying conductors running across the unit and affecting sound. When powering on or off, there's no need to observe a specific sequence regarding the connected devices. However, like with any audio signal chain, power amplifiers should always be powered on last and powered off first. The MC16 can be powered on and off with the use of a circuit breaker, as long as the total load does not exceed the rating of the latter.

After switching on the MC16 the software version is indicated through a button (for example 1) lighting up. Then all buttons light up top down. Afterwards the start configuration is loaded. Input 1 is selected to monitor. All 16 speaker outputs are activated and the Mute button is active for safety reasons. To monitor Input 1 the Mute button has to be deactivated! When powering on the device for the next time, the respective last setting is loaded.

XLR inputs and outputs

We used exclusively Switchcraft/Neutrik XLR input and output plugs to guarantee perfect connectivity in the studio. They provide an optimal connection thanks to their electromechanical design and large contact surface.

The image shows the XLR connectors pinout. They are balanced and have three conductors or wires. Conductor 2 (Pin 2) corresponds to the (+) or hot Signal.

In case an unbalanced connection is necessary, the correct polarity of the conductors needs to be observed.

```
Input                                    Output
balanced    unbalanced      balanced    unbalanced

  2   1       2   1          1    2      1    2
    3           3              3           3

                          1=GND
                          2=hot (+)
                          3=cold (-)
```
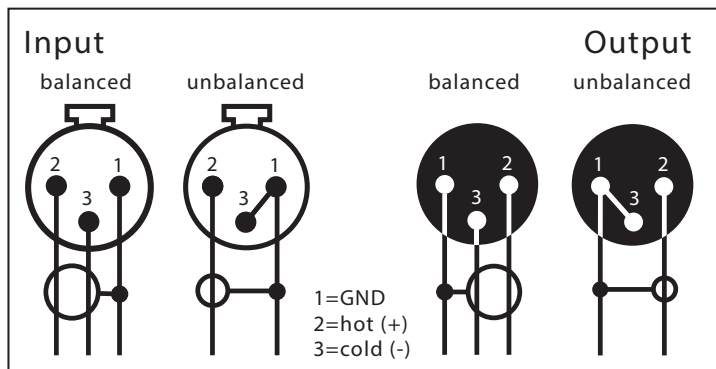
Ground Lift switch to avoid ground loops

On the rear panel of the MC16 Mastering Monitor Controller (see page 8) is also a „GND LIFT" (Ground Lift) switch to avoid any ground loops. Ground loops take place when gear connected in the same network have different potentials.
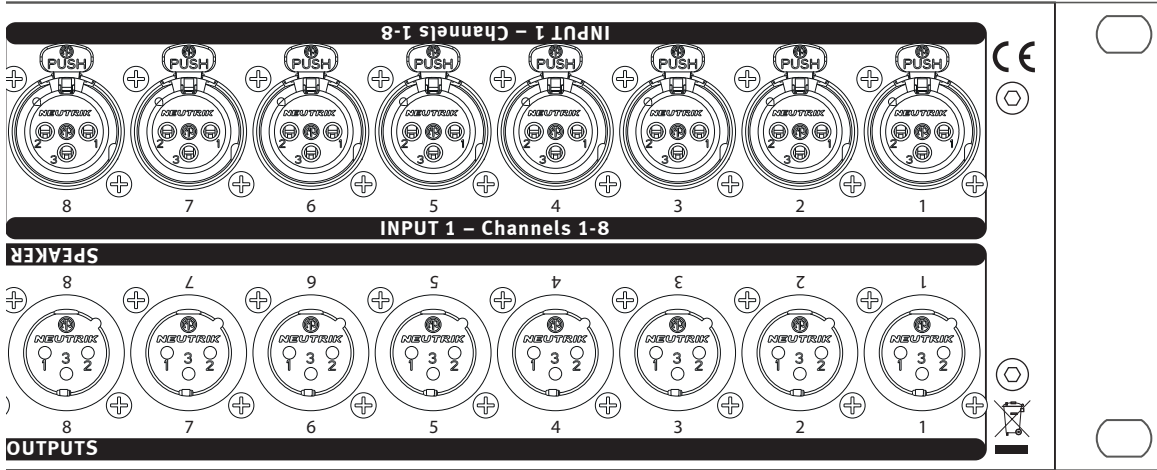
The GND LIFT switch disconnects the equipment ground from the service ground to avoid such problems. The Ground Lift function is activated (= equipment ground disconnected) when the switch is depressed.

Cabling: Rear Side
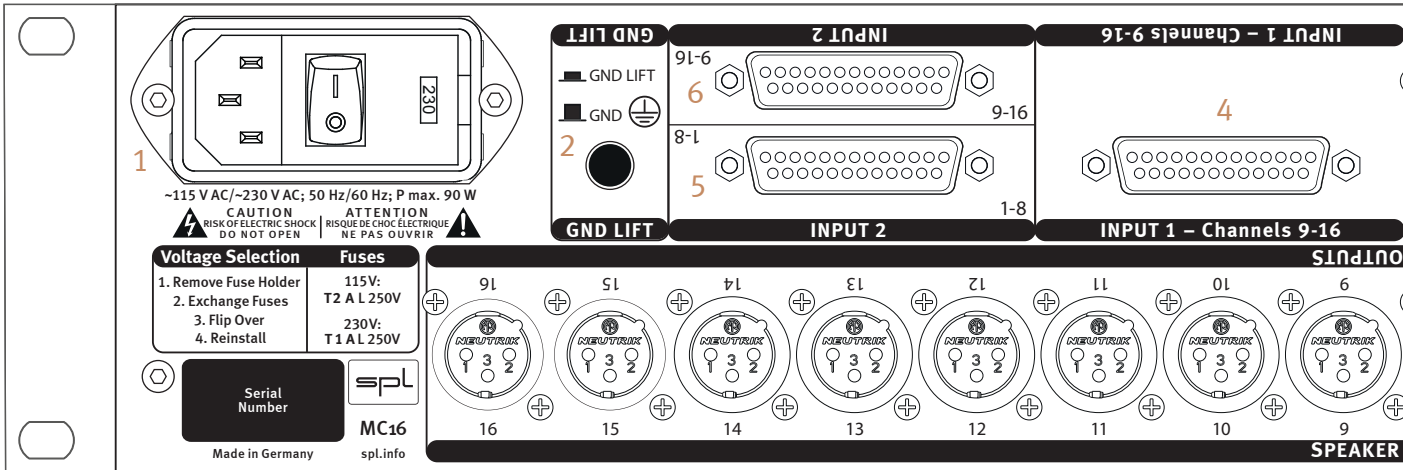
1 Voltage (see details on page 6)

2 Ground-Lift (see details on page 7)

3 Inputs 1 Channels 1 - 8

4 Inputs 1 Channels 9 - 16

5 Inputs 2 Channels 1 - 8

6 Inputs 2 Channels 9 - 16

7 Speaker Outputs 1 - 16

3

INPUT 1 — Channels 1-8

8 7 6 5 4 3 2 1

INPUT 1 – Channels 1-8

SPEAKER

8 7 6 5 4 3 2 1

8 7 6 5 4 3 2 1

OUTPUTS

Pin assignment of a DB-25 connector (Tascam standard)

1 2 3 4 5 6 7 8

GCH GCH GCH GCH GCH GCH GCH GCH

13 ● 1

25 ● 14

G=GROUND (GND), C=COLD (-), H=HOT (+)
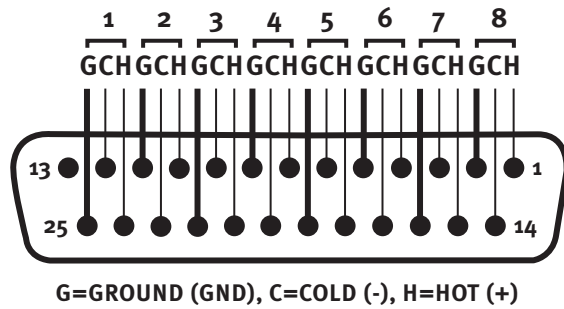
Rear Side: Connections

Input 1 Channels 1 - 8

In the first eight channels of the 16-channel input section 'Input 1', the MC16 features balanced XLR input jacks (female). This is quiet helpful if you (for example) pair the MC16 with an SPL DMC, because in this way single cable connections can easily be connected back and forth to the DMC.

Input 1 Channels 9 - 16

Input channels 9-16 of the 16-channel input section 'Input 1' are led through an eight-channel DB-25 connector into the MC16. The DB-25 connector is assigned according to the pin assignment of the Tascam standards and it is also balanced. The DB-25 pin assignment (Tascam standard) is shown in the diagram on page 9.

Input 2 Channels 1 - 8

Input channels 1-8 of the 16-channel input section 'Input 2' are led through an eight-channel DB-25 connector into the MC16. The DB-25 connector is assigned according to the pin assignment of the Tascam standards and and it is wired balanced.

Input 1 Channels 9 - 16

The inputs channels 9-16 of the 16-channel input section 'Input 2' are led through an eight-channel DB-25 connector into the MC16. Of course the DB-25 connector is assigned according to the pin assignment of the Tascam standards and wired balanced.

Speaker Outputs 1 - 16

The MC16 features 16 speaker outputs, to which active speakers or power amplifier can be connected. All 16 outputs are balanced XLR output jacks (male).

Pairing MC16 and DMC

The following diagram shows an example of the pairing of DMC and MC 16 for a 16 channel surround setup. In case the MC16 is used as a stand-alone device, it is possible to connect the output pair 1/2 of the DAC directly to the inputs 1 and 2 at the MC16. Thus, louspeakers L and R are connected to the speaker outputs 1 and 2, as well as the LFE output to the speaker output 4 of the MC16.

If the MC16 is used as a stand-alone device, the output pair 1/2 of the DAC can of course be connected to the inputs 1 and 2. Thus, loudspeakers L and R are connected to the loudspeaker outputs 1 and 2 as well as the LFE loudspeaker at the speaker output 4 of the MC16.
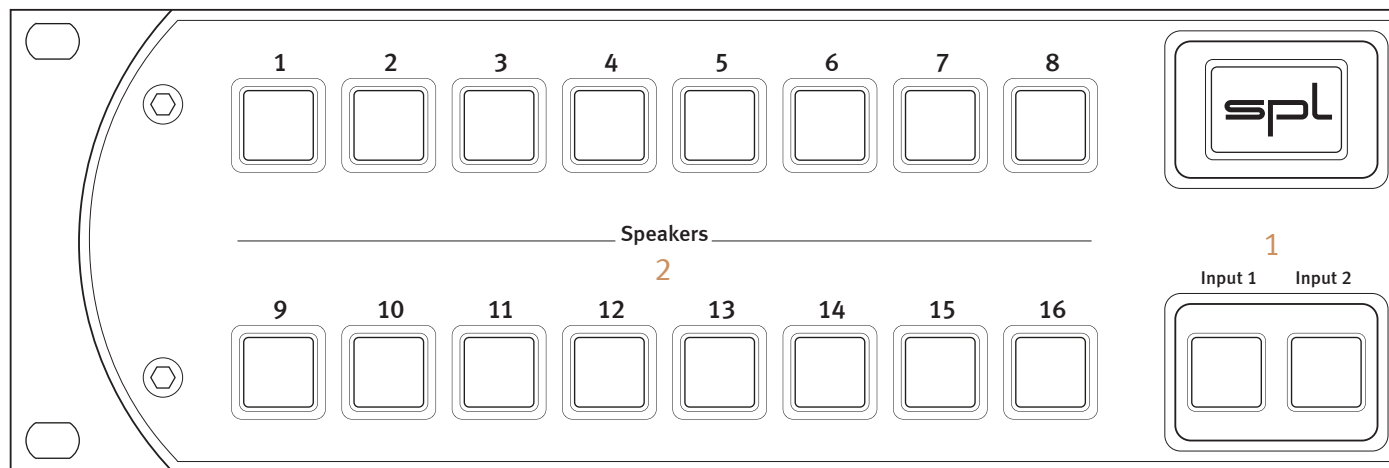
On the product website we provide an SPL MC16 video manual: mc16.spl.audio

Find further information about the SPL DMC Mastering Console on the product website: dmc.spl.audio
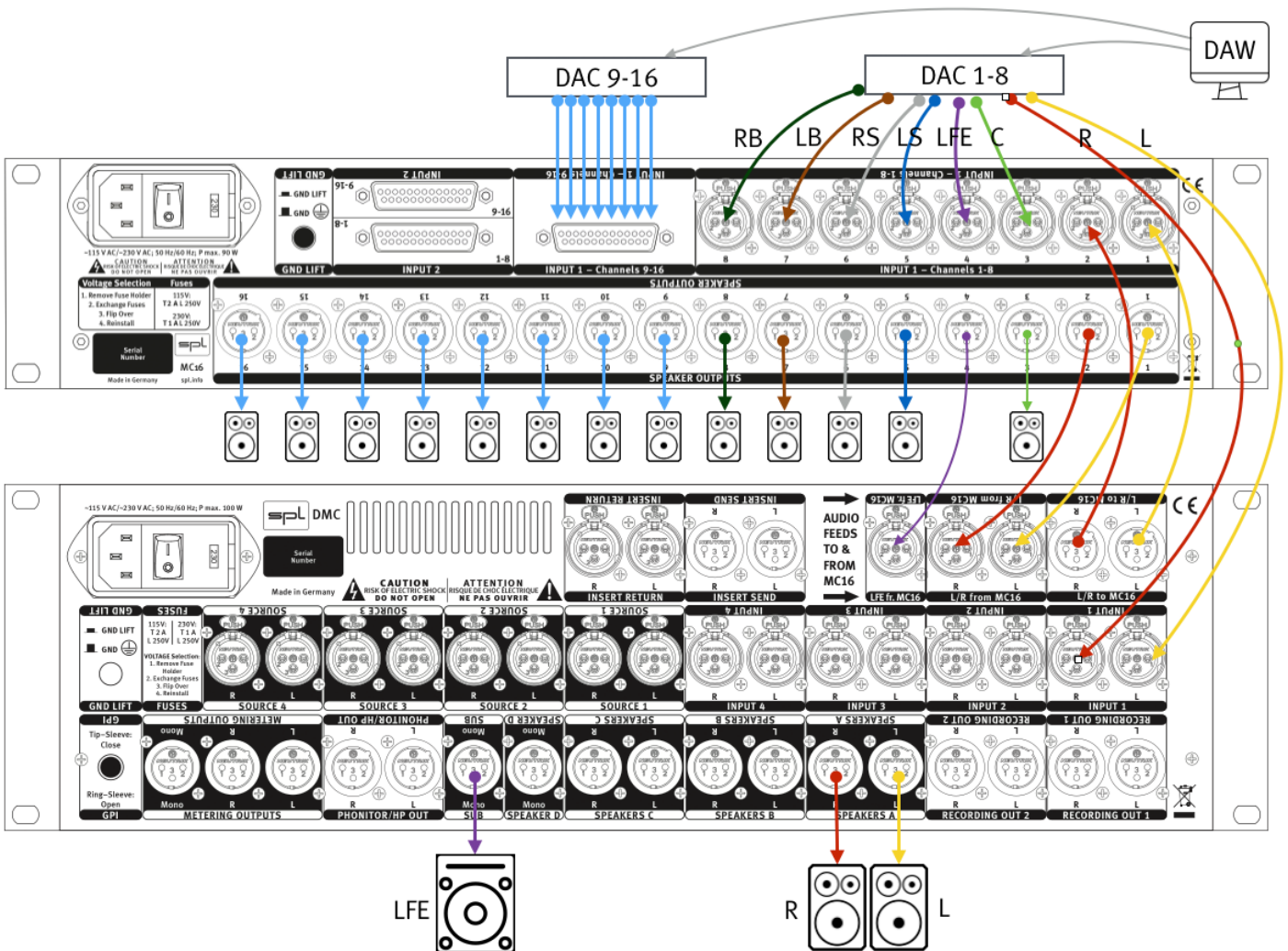
Control Elements

1   Input 1 / Input 2

2   Speakers

3   Monitor Level

4   Mute

5   Dim

6   Solo

7   Preset A, B, C

Labeling

It is possible to individually label all buttons. A labelling foil which features the most common surround speaker designations is included in this manual. To insert the label into the button you have to cut out the respective label, remove the cover of the respective button and put the label between this cover and the inlay. Of course it is also possible to design your own labels. Therefore you can download a template at mc16.spl.audio.
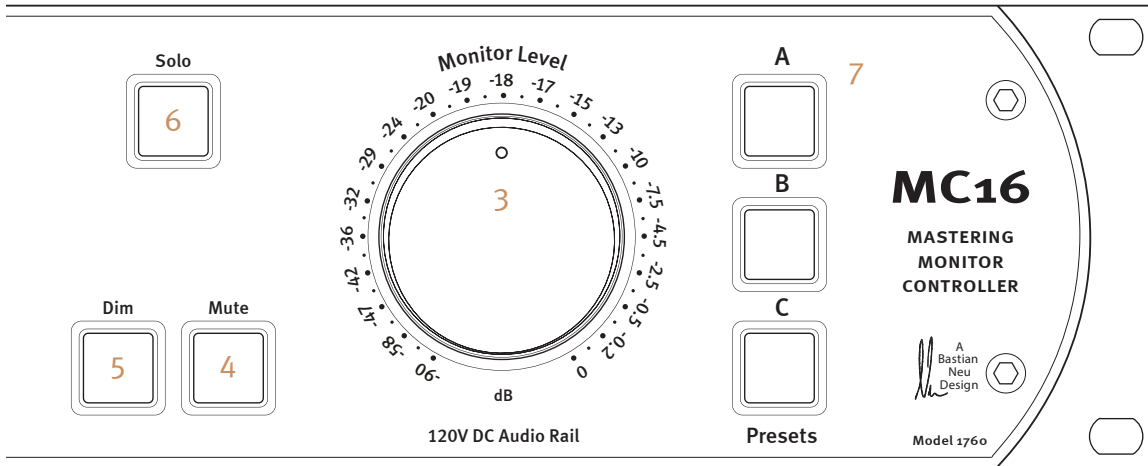
Input 1 / Input 2

With the four buttons of the input section, you can select between the four different stereo inputs of the category inputs. This selected source can be routed with the Insert and recorded with the Recording Output. Only one button can be activated in this section. If another button is pushed, this button is activated. A multiple selection is not possible. The current selection is visualized by the button lighting up. If the button is pushed a second time, the Direct Input Monitoring is activated. This mode is indicated by a blinking Input button. In this mode, all functions processing the input signal are not led on the monitoring bus but stay on the recording bus.

Speakers

With the sixteen buttons of the speaker section you can activate the respective speaker outputs on the rear of the MC16 (Speaker Outputs 1 – 16). If a button lights yellow, the respective output is active. The 16 inputs of Input 1 and Input 2 are forwarded to the outputs without any further routing options. Channel 1, wheter from Input 1 or Input 2, consequently is always routed to speaker output 1. According to this and to give you another example, Channel 7, whether from Input 1 or Input 2, is always routed to speaker output 7. This is particularly useful, because in this way the initial routing of a DAW session always corresponds to the routing of the MC16.

Control Elements

Monitoring Level

With this 16-gang potentiometer, you can control the level of the monitoring, which basically means the level of the speakers. This analog potentiometer is the world's first 16-gang precision potentiometer, specially designed for SPL. Thanks to the red LED on the control, you can always see your current setting, even in dark studio surroundings.

Mute

With the Mute button all outputs are turned off, without you having to adjust the volume setting at the Monitoring Level control. When the Mute button is active, it lights red.

Solo

With the Solo button, the MC16 is switched into Solo mode. If the Solo mode is active, the Solo button lights red. If you now press the button of the speaker section, it is the only button active and all other buttons are deactivated. This way it is possible to monitor this selected channel in Solo mode. If the Solo mode is deactivated, the previous selection of speaker outs is activated again.

Dim

This Dim button reduces the monitoring volume within the monitoring section, more precisely it reduces the output signal at the speaker outputs by -20dB. If the Dim button is active, it lights yellow.

Presets A, B, C

With the three buttons of the Preset section it is (for example) possible to save and recall frequently repeating surround formats. If for example you'd like to create a 5.1 preset, the first six channels (Channel 1-6, Speakers 1-6) have to be activated (L, R, C, LFE, Ls, Rs). If you now press the button Preset A until it blinks, this preset is saved. But you can also create Solo presets for a fast monitoring of certain speaker groups. Therefore you have to activate the Solo button. If, for example, you want to create a Solo group with ceiling loudspeakers of a 9.1.6 Dolby Atmos® format, you have to select the respective channels (Channel 11-16, Speakers 11-16). If you then press button Preset B until it flashes the Solo group is saved on this preset. You can save six presets in total. 3 Solo presets and 3 surround format presets.

You can find further information concerning this topic within the SPL MC16 video manual (title: "ScreenShow") on the product website: mc16.spl.audio

Measurements

Inputs

Max. Input Level .... +32,5 dBu

Input Inpedance .... 20 kOhm (sym.)

Outputs

Max. Output Level .... +32,5 dBu

Output Impedance .... ‹ 600 Ohm (sym.)

Noise (unweighted) .... -97,3 dBu

Noise (A-weighted) .... -102,4 dBu

Noise (CCIR) .... -100,8 dBu

THD & N (at 24dBu) .... › 112 dB

Common-Mode-Rejection (at 0 dBu).. › -82 dBu

Crosstalk (adjacent channels, at 1kHz) .... -100 dBu

Transmission Bandwidth: 10 Hz-200 kHz

10 Hz = -0,12 dB; 100 kHz = -0,42 dB; 200 kHz = -1,3 dB

Power Consumption: .... 0,29 Amp, 230V/50Hz, 50 Watt, 65,7 VA

0,58 Amp, 115V/60Hz, 50 Watt, 65,7 VA

Fuses .... 230 V/50 Hz: 1 Amp

115 V/60 Hz: 2 Amp

Dimensions

Standard EIA 19 Inch Housing/2U .... 482 x 88 x 300 mm / ca. 19" x 3,5" x 11,8"

(front panel excl.)

Weight .... 8,4 kg / 18,51 lb

Security Advices

Connections

Only use the connections as described. Other connections can lead to health risks and damage the equipment.

Water and humidity

Do not use this device anywhere near water (for example in a bath room, a damp cellar, near swimming pools, or similar environments). Otherwise your are dealing with an extremely high risk of fatal electrical shocks!

Insertion of objects or fluids

Be careful to not insert any object into any of the chassis openings. You can otherwise easily come into contact with dangerous voltage or cause a damaging short circuit. Never allow any fluids to be spilled or sprayed on the device. Such actions can lead to dangrous electrical shocks or fire!

Ventilation

The vent openings on the unit are meant to avoid the PASSEQ from overheating. You should never cover nor block these openings.

Power Supply

Power the unit exclusively with the voltage rating specified on the unit. In case of doubt, contact your local dealer or electric provider. Disconnect the unit from the electric power grid if you are not going to use it for a long period of time. Unplug the power chord from the mains to cut power supply to the unit. Always make sure that the mains plug is easily accessible.

Opening the unit

Simply put: DON'T, if you are not a certified SPL technician or engineer. Really: Do not open the device housing, as there is great risk you will damage the device, or – even after being disconnected – you may receive a dangerous electrical shock!

Cord protection

Make sure that your power and audio signal cords are arranged to avoid being stepped on or any kind of crimping and damage related to such event. Do not allow any equipment or furniture to crimp the cords. Power connection overloads: Avoid any kind of overload in connections to wall sockets, extension or splitter power cords, or signal inputs. Always keep manufacturer warnings and instructions in mind.

Overloads create fire hazards and risk of dangerous shocks!

Lightning

Before thunderstorms or other severe weather, disconnect the device from wall power; do not do this during a storm in order to avoid life threatening lightning strikes. Similarly, before any severe weather, disconnect all the power connections of other devices and antenna and phone/network cables which may be interconnected so that no lightning damage or overload results from such secondary connections.

Controls and switches

Operate the controls and switches only as described in the manual. Incorrect adjustments outside safe parameters can lead to damage and unnecessary repair costs. Never use the switches or level controls to effect excessive or extreme changes.

Repairs

Unplug the unit from all power and signal connections and immediately contact a qualified technician when you think repairs are needed – or when moisture or foreign objects may accidentally have reached inside the housing, or in cases when the device may have fallen and shows any sign of having been damaged. This also applies to any situation in which the unit has not been subjected to any of these unusual circumstances but still is not functioning normally or its performance is substantially altered. In cases of damage to the power supply and cord, first consider turning off the main circuit breaker before unplugging the power cord.

Replacement/substitute parts

Be sure that any service technician uses original replacement parts or those with identical specifications as the originals. Incorrectly substituted parts can lead to fire, electrical shock or other dangers, including further equipment damage. Safety inspection: Be sure always to ask a service technician to conduct a thorough safety check and ensure that the state of the repaired device is in all respects up to factory standards.

Cleaning

Do not use any solvents, as these can damage the chassis finish. Use a clean, dry cloth (if necessary, with an acid-free cleaning oil). Disconnect the device from your power source before cleaning.

Notes on Environmental Protection

At the end of its operating life, this product must not be disposed of with regular household waste but must be returned to a collection point for the recycling of electrical and electronic equipment. The wheelie bin symbol on the product, user's manual and packaging indicates that. The materials can be reused in accordance with their markings.

Through reuse, recycling of raw materials, or other forms of recycling of old products, you are making an important contribution to the protection of our environment.

Your local administrative office can advise you of the responsible waste disposal point.

WEEE Registration: 973 349 88.

Contact

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Declaration of CE Conformity

The construction of this unit is in compliance with the standards and regulations of the European Community.