

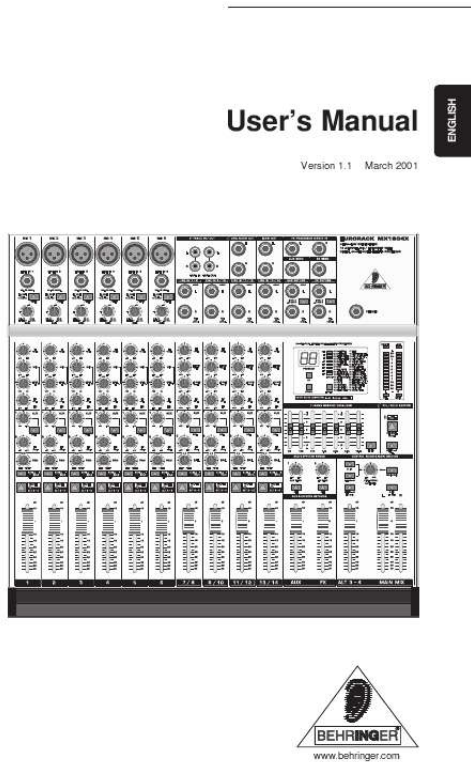


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You can read the recommendations in the user guide, the technical guide or the installation guide for BEHRINGER MX1804X. You'll find the answers to all your questions on the BEHRINGER MX1804X in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual BEHRINGER MX1804X  
User guide BEHRINGER MX1804X  
Operating instructions BEHRINGER MX1804X  
Instructions for use BEHRINGER MX1804X  
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**EUROSTACK® MX1804X**



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**Manual abstract:**

*DETAILED SAFETY INSTRUCTIONS: All the safety and operation instructions should be read before the appliance is operated. Retain Instructions: The safety and operating instructions should be retained for future reference. Heed Warnings: All warnings on the appliance and in the operating instructions should be adhered to. Follow instructions: All operation and user instructions should be followed. Water and Moisture: The appliance should not be used near water (e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool etc.). Ventilation: The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa rug, or similar surface that may block the ventilation openings, or placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.*

*Heat: The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliance (including amplifiers) that produce heat. Power Source: The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance. Grounding or Polarization: Precautions should be taken so that the grounding or polarization means of an appliance is not defeated. Power-Cord Protection: Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords and plugs, convenience receptacles and the point where they exit from the appliance. Cleaning: The appliance should be cleaned only as recommended by the manufacturer.*

*Non-use Periods: The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time. Object and Liquid Entry: Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings. Damage Requiring Service: The appliance should be serviced by qualified service personnel when: - The power supply cord or the plug has been damaged; or - Objects have fallen, or liquid has been spilled into the appliance; or - The appliance has been exposed to rain; or - The appliance does not appear to operate normally or exhibits a marked change in performance; or - The appliance has been dropped, or the enclosure damaged. Servicing: The user should not attempt to service the appliance beyond that is described in the Operating Instructions. All other servicing should be referred to qualified service personnel.*

*2 EURORACK MX1804X FOREWORD Dear Customer, Welcome to the team of EURORACK users and thank you very much for expressing your confidence in BEHRINGER products by purchasing this unit. It is one of my most pleasant tasks to write this letter to you, because it is the culmination of many months of hard work delivered by our engineering team to reach a very ambitious goal: To produce a compact mixer, which fully satisfies your and our expectations and delivers a superior sound quality, easy operation and technical specifications. In addition to that the mixer is affordable for almost every musician. The task to design the EURORACK certainly meant a great deal of responsibility, which we assumed by focusing on you, the discerning user and musician. It also meant a lot of work and night shifts to accomplish this goal. But it was fun, too. Developing a product usually brings a lot of people together, and what a great feeling it is when everybody who participated in such a project can be proud of what we've achieved. It is our philosophy to share our joy with you, because you are the most important member of the BEHRINGER family. With your highly competent suggestions for new products you've greatly contributed to shaping our company and making it successful. In return, we guarantee you uncompromising quality (manufactured under ISO9000 certified management system) as well as excellent technical and audio properties at an extremely favorable price.*

*All of this will enable you to fully unfold your creativity without being hampered by budget constraints. We are often asked how we can make it to produce such high-grade devices at such unbelievably low prices. The answer is quite simple: it's you, our customers! Many satisfied customers means large sales volumes enabling us to get better conditions of purchase for components, etc. Isn't it only fair to pass this benefit back to you? Because we know that your success is our success, too! I would like to thank the following people, whose help on "Project EURORACK MX1804X" has made it all possible: L The existing users of BEHRINGER equipment (whose comments and suggestions have made them the most important members of the BEHRINGER design team),*

*L Thorsten (for this marvellous manual layout), L Bernhard (Rammi) (whose technical ingenuity is unique), L C.W. for the fine mechanics (key-phrase "Tooling modification"), L and all the others, who have made very personal contributions. My friends, it's been worth the trouble! Thank you very much, Uli Behringer 3 EURORACK MX1804X MX1804X Ultra low-noise 18-channel 4-bus mixer with integrated VIRTUALIZER multi-effects processor s 6 mono input channels with balanced XLR and TRS connectors and inserts s Ultra low-noise discrete microphone preamps with +48 V phantom power s 4 stereo input channels with balanced TRS connectors s 2 additional multi-functional stereo channels with 60-mm faders s 24-bit stereo multi-effects processor with ultra-high resolution 24-bit AD/DA converters, for internal and external use s 32 original VIRTUALIZER presets including 16 different reverbs, delays, chorus, flanger, pitch shifter, speaker simulation and various combinations s Switchable 7-band graphic equalizer for ultimate main mix equalization s Alt 3-4 bus routable to main mix and control room with insert, PFL and 60-mm master fader s Extremely high headroom--offering more dynamic range s Balanced inputs and main outputs for highest signal integrity s Ultra-musical 4-band EQ (stereo channels) and 3-band EQ with sweepable mid band (mono channels) s Peak LEDs and switchable low-cut filter on all mono channels s 2 aux sends (aux 1 pre/post) per channel--for internal or external effects and monitoring s Master aux sends with gain control and PFL s Mute/Alt 3-4, Solo-In-Place and Pre-Fader-Listen function on all channels. s Separate main mix, Alt 3-4, control room and headphones outputs s 2-track inputs assignable to main mix or control room/headphones outputs s Highly accurate 12-segment bargraph meters s High-precision 60-mm faders and sealed potentiometers s Rugged design power supply ensures superior transient response s State-of-the-art 4580 ICs and high-quality components for crystal-clear audio performance s Extremely rugged construction ensures long life even under the most demanding conditions s Manufactured under ISO9000 certified management system 4 EURORACK EURORACK MX1804X TABLE OF CONTENTS 1.*



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*INTRODUCTION..*

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Alt 3-4 output.

*There are inserts for the mono channels, the Alt 3-4 and the main mix bus. 1.2 Before you begin 1.2.1 Metering The channels 1 to 6 have peak LEDs, while the L and R outputs have 12 segment bargraph meters. The L/R meters double up as mono PFL or stereo solo meters. The meters should average around 0 dB during loud passages. If they read persistently higher, or are peaking above +10 dB, reduce either the main L/R faders and/or channel faders, or (as a last resort) channel input gain. Maybe it's time to do a round of PFL metering. 1.*

*2.2 PSU (power supply unit) Any amplifier circuit is limited in its transient response by the available current. Every mixer has numerous line level operational amplifiers (op-amps) inside. When being driven hard, many desks begin to show signs of stress due to power supply limitations.*



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Not so with the EURORACK MX1804X.

The sound will always stay clean and crisp right up to the operating limits of the op-amps themselves, thanks to our generous 40 W external power supply unit. Please connect the PSU with the EURORACK MX1804X PSU connector and switch on your MX1804X with the power switch . on the rear panel of your mixer + Do not connect the PSU to the EURORACK while the PSU is connected to the mains supply. Connect switched-off desk and PSU first before you connect the PSU to the mains supply. Lastly switch on desk.

1.2.3 Warranty Please take the time to have the warranty card filled out completely by your specialized dealer, and return it within 14 days after the date of purchase, so as to be entitled to benefit from our extended warranty. You may also use our online registration option available on the Internet at [www.behringer.com](http://www.behringer.com). You will find the serial number of your MX1804X on the rear panel. 1.2.4 Packing Your BEHRINGER EURORACK was carefully packed in the factory and the packaging was designed to protect the unit from rough handling.

Nevertheless, we recommend that you carefully examine the packaging and its contents for any signs of physical damage, which may have occurred in transit. + 8 If the unit is damaged, please do NOT return it to us, but notify your dealer and the shipping company immediately, otherwise claims for damage or replacement may not be granted. Shipping claims must be made by the consignee. 1. INTRODUCTION EURORACK MX1804X 1.2.4 Rack mounting the MX1804X Enclosed in the shipping box you will find a 19" rackmount kit. If you want to make your MX1804X a rack mixer, loosen the screws from the side panels and use them to fix the rack ears (note, that there is a left and a right one). + + Be sure that there is enough space around the unit for cooling and please do not place the MX1804X on high temperature devices such as power amplifiers etc. to avoid overheating.

When switched on, parts of the desk and the power supply unit will become very warm, which is normal during operation. 2. OPERATION 2.1 Mono input channel Each channel comes with a balanced line input on 1/4" TRS connector , and an XLR microphone input . Phantom powering for the use of condenser microphone is switchable from the rear panel with switch .

The gain circuit has an unusually wide range, obviating the need for mic/line switching. The crucial operating levels +4 dBu and -10 dBV are clearly and accurately legended. + When using the microphone input please make sure nothing is connected to the same channel's line input, and vice versa. 2.1.

1 Input level setting Channel input level is determined by the GAIN control . Use the PFL/SOLO switch to bring the channel input onto the left and right bargraph meters respectively. This also sends the solo/PFL-ed signal to the left and right speakers. For level-setting (as opposed to localized listening) choose to use the mono PFL bus rather than the post-fader (post-channel Pan) stereo solo bus (CHANNEL MODE switch UP). Solo/PFL never interrupts the mix at the main recording outputs. It follows that aux sends must also be unaffected, since they contribute directly to the main mix. In addition to switchable PFL/solo metering , a channel LED illuminates when a channel is going into overload. You do not want the peak light to come on except very intermittently during a take or a mix. If it does light persistently, reduce input gain. There is a steep low-cut filter woolly bottom end, etc.

2.1.2 Equalizer All mono input channels are fitted with three-band EQ and the above mentioned switchable low-cut filter for eliminating unwanted subsonics. All three bands have up to 15 dB of cut and boost, with a centre detent for off. The upper and lower shelving controls have their frequencies fixed at 12 kHz and 80 Hz respectively. On the MX1804X, the midrange control is semi-parametric with a peaking response, Q fixed at 1 octave, sweepable from 100 Hz to 8 kHz . 2.1.3 Aux sends Both aux sends are mono and post-EQ. Aux send 1 can be taken from a point before or after the channel fader, i.

e. pre or post by switch . Aux send 2 is always wired post-fader. You can use the 1/4" connector to receive the signal of aux send 1. The control of aux 2, which is called FX, you can send signals from all channels to the internal effects processor.

Of course, you can use the aux send 2 also to head for external effects devices. For that you can use the FX send and the FX return jack on the top of the mixer. As a result the internal effects processor is no longer provided with an input signal. For almost all effects send purposes, you will want aux sends to be post-fader, so that when a fader level is 2. OPERATION 9 , slope at 18 dB/oct.

, -3 dB at 75 Hz, for reducing floor rumble, explosives, EURORACK MX1804X adjusted, any reverb send from that channel follows the fader. Otherwise, when the fader is pulled down, the reverb from that channel would still be audible. For cueing purposes, aux sends will usually be set pre-fader, i.e. independent of the channel fader and mute. Most reverbs etc. sum internally the left and right inputs. The very few that don't may be driven in true stereo by using 2 aux sends. There is +15 dB of gain on every aux send. Such a high boost is usually only appropriate where the channel fader is set around -15 dB or lower.

Here, an almost exclusively wet signal will be heard. In most consoles, such a wet mix required the use of a pre-setting for the channel aux send, losing fader control. With the EURORACK you can have a virtually wet mix with fader control. 2.1.4 Routing, fading and muting . These are Level to the main mix and Alt 3-4 buses is ultimately determined by the channel faders specially manufactured for BEHRINGER mixing consoles, and are designed to give a smooth logarithmic taper of a type more usually associated with megabuck consoles. The low level performance particularly is far smoother than that of a normal budget fader. Channel pan positions the output of the channel in the stereo field. Its constant-power design ensures there are no level discrepancies whether a signal is hard-panned, centre-stage, or somewhere in-between.

Such pin-point accuracy will be a revelation if you have been working on consoles with lower quality circuits. Solo/PFL we encountered in section 2.1.1. Solo also follows channel pan.

is ergonomically placed immediately above the channel fader. Engaging mute, The MUTE/ALT 3-4 button indicated by , is equivalent to setting a fader level of minus infinity. On the MX1804X the button serves two functions. When mixing directly to stereo, it acts as a normal mute. However, this button also acts as a routing button to the ALT 3-4 outputs.

In other words, you select between the main mix and Alt 3-4 stereo buses via switch . This is very useful when submixing live or recording to multitrack, as we shall see later (see chapter 4 "APPLICATIONS"). 2.2 Stereo input channel Each stereo channel comes with two balanced line level inputs on 1/4" TRS connectors signals.



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When only the left input is connected, the channel operates in mono. 2.2.1 Input level The stereo channels of the MX1804X are designed for typical line level signals. With the help of the PFL function you can control the level of the input signal in the stereo channels. If it is necessary you can adapt the output level of the connected device (MIDI instruments, effects devices, etc.

) via its output level control. 2.2.2 Equalizer The stereo input channels are fitted with four-band EQ. , high midrange , low midrange and lower The upper fixed at 12 kHz, 3 kHz, 500 Hz and 80 Hz respectively. shelving controls have their frequencies , for left and right All bands have up to 15 dB of cut and boost, with a centre detent for off. A stereo equalizer is generally preferable to using two mono equalizers when EQ-ing a stereo signal, as often discrepancies between left and right settings can occur. 2.2.3 Aux sends These are the same as for mono channels (see 2.

1.3). Note that a mono sum is taken from the stereo input. 10 2. OPERATION EURORACK MX1804X 2.

2.4 Routing The only difference here from the mono channel described is in the implementation of the balance control . When a channel is run in stereo, this control functions as a balance control, determining the relative balance of the left and right channel signals being sent to the left and right main mix buses (or Alt 3-4). For example, with the balance control turned fully clockwise, only the right portion of the channel's stereo signal will be routed to the main mix.

Balance also determines the relative amount of left and right channel signals being sent to buses 3 and 4 respectively when switch MUTE/ALT 3-4 is engaged.

When you push the PFL/SOLO button the PFL/solo control LED will light up. 2.3 Inserting Insert points are useful for adding dynamic processing or equalization to a channel or the mix. Unlike reverbs etc., which are usually added to the dry signal, dynamic processing is normally applied across an entire signal. Here an aux send would be inappropriate. Instead the signal is intercepted somewhere along the channel, fed through the dynamics processor and/or EQ, then returned to the console at the same point where it left. The insert point is normalized, i.e. the signal is only interrupted when a jack is plugged into it (see chapter 4.

3 "Patchbay"). 2.3.1 Mono channels All mono input channels have got insert points. Each insert point is accommodated on a single TRS connector socket 3 wired tip = send, ring = return, sleeve = ground/ screen. Inserts are always pre-fader, and also preEQ and pre-aux sends. Insert points may also be used as pre-EQ direct outputs without interrupting the signal flow. Note that if you are using the EURORACK insert as a direct output, and you want to maintain the signal flow down the channel, you should use a TRS connector with tip and ring connected. Note that this is not the same as for unbalancing a balanced lead, where the ring and sleeve would be connected (see chapter 6 "INSTALLATION"). You can extend the functionality of your insert points by wiring them onto a jackfield patchbay, where send and return can be accessed on separate sockets (see chapter 4.

3). 2.3.2 Stereo channels If you want to insert a dynamics processor etc. into a stereo input channel or one of the other stereo line inputs, it must be done between the source output and the EURORACK input, as these channels have no bona-fide insert point.

2.3.3 Main mix For the main mix there are two insert jacks 2.3.4 Alt 3-4 On the rear panel of your MX1804X you can also find insert jacks for the Alt 3-4 bus. on the rear panel. 2.4 Main section 2.4.1 Aux sends Master aux send levels are determined by and . These controls have a centre detent indicating unity gain.

Don't worry if your effects unit has no input gain control--you have a further +15 dB available from these outputs. The PFL buttons and offer you the possibility to control the signals routed to the aux busses via the control room output . 2. OPERATION 11 EURORACK MX1804X 2.

4.2 Additional stereo line inputs and FX return There are two additional stereo line inputs (aux return operates in mono if only the left channel socket has a jack connected. ) on your MX1804X. Aux return 1 Level can be adjusted by the faders and . The returns are permanently assigned to the main mix. The aux return 2 (FX return) is usually reserved for the internal effects processor. But you can also use the FX return input connectors to return signals from external devices. As a result you can also use FX return as an additional stereo line input. The aux returns have been cleverly designed to be multifunctional. They may be used for returning the outputs of effects units.

You can use them as tape returns from a multitrack recorder. They may also be used as extra instrument inputs, especially if your MIDI keyboard or rack supplies a pre-mixed stereo signal. Certain stereo effects produce a perceived imbalance between the left and right channel levels. To correct for this you will have to bring your stereo effect back on a stereo channel, which has a balance control. Via the switches +4 dBu.

2.4.3 Metering Main mix/solo/PFL level is displayed on a pair of highly-accurate 12 segment bargraph peak meters . Four additional LEDs indicate power on , +48 V phantom power present , and whether the mono pre-faderlisten bus or the stereo solo bus is engaged. 2.

4.4 Channel mode The CHANNEL MODE switch channel solo buttons. determines whether Solo-In-Place or Pre-Fader-Listen is assigned to the and you can choose between the two different operating level settings -10 dBV and Solo Solo is the preferred method for auditioning an isolated signal, or group of signals. Whenever a solo button is pressed, all unselected channels are muted in the monitors. Stereo panning is maintained. The solo bus is derived from the output of the channel pans, aux sends and stereo line inputs. It is always post-fader. PFL Pressing once disengages the stereo solo bus, and replaces it with a separate mono PFL (Pre-FaderListen) bus. Now any channel which is solo-ed, isn't. It is PFL-ed instead.

PFL should always be used for gain setting (see also chapter 3 "PRACTICE"). 2.4.5 2-track input and output Input A 2-track input, on RCA connectors audio equipment. , provides easy connection to DAT recorders and other semi-professional 2 TK TO CONTROL ROOM The 2-track input is primarily for auditioning mix playback from tape. Switch routes this signal to the monitors and/or phones. However, it can also be routed to the main mix via button 2 TK TO MIX and will act as an additional input for tape playback, MIDI instruments etc. Here switch should be disengaged, or you will be listening to the 2-track signal twice over! With depressed you have another stereo line input available to the mix, useful e.g. for adding the output of a second EURORACK or a BEHRINGER ULTRALINK PRO MX882 to your mix (see chapter 4.

4 "Expanding"). Output The main mix output is delivered by XLR connectors back panel as well as by RCA connectors on the front.



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and TRS connectors . and on the front and Level is ultimately determined by a pair of precision faders + If you connect a compressor or a noise gate to the 2-track outputs smooth fades are no longer possible. 12 2.

**OPERATION EURORACK MX1804X** Although the 2-track output is primarily designed for recording, it can also be used as a PA feed, or as a send to the input of your sampler. Depressing on the rear panel will lower the level at the XLR connectors by 20 dB. 2.4.6 Monitor section Though most of you will want to audition the main mix include the Alt 3-4 bus and 2-track playback .

most of the time there are exceptions. These A single volume control sends the level to the headphones and main monitors. The bargraph meter shows the level of the chosen signal. You can connect your headphones to the headphones connector on the front panel. The output signal of the main mix remains untouched when you choose different sources for monitoring. If you want to audition external sources very often, you could do worse than connect your 2-track input to a hi-fi pre-amp, allowing you to monitor a variety of extra sources such as vinyl, cassette recorder, CD player, etc. 2.4.7 Alt 3-4 output By depressing the MUTE/ALT 3-4 button the main mix. a channel's output will be routed to the Alt 3-4 output instead of .

Use to have Level to the Alt 3-4 outputs (TRS connectors on the back panel) is adjusted by the fader and up). the signal PFL-ed ( Alt 3-4 is likely to bewilder newcomers. We want to illustrate how this feature may be used most effectively. Subgroups are commonly used as a mixing aid both live and in the studio, e.g. to control the outputs from all drum channels with just 1 or 2 submaster faders. They are also used to route to multitrack recorders. There are no fully-fledged subgroups on the MX1804X. However, the Alt 3-4 bus offers you a second independent stereo submix with its own submaster stereo fader. Combining the Alt 3-4 outputs with the main mix may be effected by pressing the switch ALT 3-4 TO MIX .

Each individual frequency band has up to 10 dB boost or cut. With the two UP and DOWN buttons you can choose the desired preset. The display shows the activated preset number. OPERATION 13 EURORACK MX1804X No. Particularly suitable for solo instruments and voices.

Plate: The sound of early reverb plates. A classic reverb program for drums and solo voices. Hall: Simulation of a small, highly reverberating hall. Very all-round effect. Studio: Middle to large rooms.

Creates a natural and multipurpose sound. Designed for live applications and mixdown. Delay: Here, the input signal is delayed with several feedbacks. However, here the echoes lose brilliance with each repetition, which simulates the trendy "vintage" effect produced by tape echo units that were widely used in the pre-digital era. Gated Reverb: Phil Collins' song "In the air tonight" made this effect famous: a reverb is cut off abruptly after a certain time. Flanger: An LFO constantly modulates the effect signal's pitch by a few cents up and down. Flanger effects are primarily used for guitars, but there are also lots of other useful applications: voices, cymbals, bass, remixes, etc. Chorus: Though similar to the flanger, chorus uses a delay function instead of feedback. Combined with the pitch shifting feature, the delay produces a very pleasant detune effect. Chorus effects are used so often and in 14 2.

**OPERATION EURORACK MX1804X** such a variety of applications that any recommendation would mean a limitation of their use. Pitch Shifter: This effect transposes the input signal to create harmonies or simply to widen the sound of a single voice. The pitch shifter effect can also be used to produce a cartoon character type voice effect. Delay & Reverb: Probably the most popular combination used for vocals, solo guitars, etc. This program uses a bright room reverb which can be used for a variety of applications. Chorus & Reverb: This algorithm combines the popular chorus effect with the reverb effect. Flanger & Reverb: In this program the flanger is combined with the reverb effect. Radio speaker: This effect simulates a radio speaker. As a result you can manipulate the sound of your music. Distortion: A clearly up-to-date program for lo-fi effects applied to vocals or drum loops, combined with a delay.

As a little extra the distortion circuit also includes an LFO-controlled notch filter which audibly wanders back and forth with maximum distortion. 2.4.10 Talkback, communication with musicians in a studio As there is no talkback mic in the EURORACK, you will have to use a mono (mic) channel and a separate microphone, routed via the cue feeds to the artists headphones. The cue feed would be normally taken from Aux Send 1, set to pre-fader.

The BEHRINGER POWERPLAY PRO HA4600 headphone distribution amplifier provides up to four separate headphones mixes for performers. 3.

**PRACTICE 3.1** Selecting inputs 1) Mono channels accept microphone or line inputs. If you are using the microphone input, make sure nothing is connected to the line input (and vice-versa).

The mic inputs are more sensitive than the line inputs. Do not connect mics with phantom power switched on. 2) Stereo channels accept -10 dBV or +4 dBu line level signals. Any stereo channel can be run in mono simply by connecting into the left jack socket only. These channels are suitable for a variety of line-level sources including MIDI instruments and Tape Returns from multitrack. 3) Stereo line inputs are primarily designed for returning effects units, though these too may be given over to multitrack returns or MIDI instrument outputs. 3.2 Initializing channels for gain setting 1) Set GAIN to minimum and all aux sends to off (fully counterclockwise). 2) Set EQ to flat (all knobs at 12 o'clock). 3) Where applicable, set LOW-CUT switch ON for most mics, OFF for signals with desired very low frequency content.

4) Set CHANNEL MODE to PFL. 5) Depress PFL/SOLO switch. 3. PRACTICE 15 3.3 Auditioning a signal and setting up a channels 1) Make a typical noise, or roll the tape. There should also be some activity at the main L/R bargraph meters, indicating the PFL level. 2) For mic/line inputs: Adjust the GAIN control until transient peaks are regularly hitting +6 dB. Continuous signals should not exceed 0 dB. 3) For stereo line inputs: Adjust the source's output gain until transients are regularly hitting +6 dB. Continuous signals should not exceed 0 dB.

4) If EQ is used, repeat steps 1) & 2). 5) If an insert is used to patch in a compressor, gate, EQ etc, use the outboard processor's bypass or effect off switch to A/B monitor the effect. If it does not have a bypass switch or equivalent, you will have to keep connecting and disconnecting the device until you complete the following procedure: Adjust the processor's output level so that effected and bypassed signals are of comparable level, i.



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e. unity gain.

6) PFL/SOLO switch UP. Move onto next channel. 3.4 Desk normalization All board settings should be set to the normal default condition before or after every session. Usually faders are set to zero (minus infinity) EQ's set flat and switched out, trim pots and channel aux sends turned fully counterclockwise etc. Many controls have a natural initial setting. For EQ cut and boost this is centre position. However, some settings, such as selecting pre or post for channel aux sends, will depend on the operating environment (e.g. studio or live), or on a particular engineer's preferred way of working. 3.5 Multitrack initialization Set up the multitrack so that any track in "record ready" condition has its input monitored when the tape is stationary. Place all tracks to be recorded into "record ready" status. (Once a recording has been made, these tracks should automatically switch to tape playback.) Check that the input levels to each track are optimized before recording commences.

3.6 Recording levels When recording to digital, it's a good idea to keep the recorder's peak meters below 0 dB. Most (not all, esp. samplers) read 0 dB with some headroom left. This is because, unlike with analog, the onset of digital distortion is as sudden as it is horrible. If you really want to take your recording level to the limit (and fully exploit 16-bit digital's 96 dB dynamic range), you'll have to do some calibrating. How to do it? Well, you could run a tone at 0 dB from the mixer and use that as your DAT reference. But your DAT may be way under its maximum input limit. Probably a better way to work out just how hard you can drive your recorder is to incrementally increase the record level until the onset of digital distortion, subtract, say, 5 or 10 dB, and never exceed that level. Engage "peak hold" on your recorder before recording if you want to confirm that you haven't.

When recording to analog, the tape machine's VU meters should show around +3 dB on bass, but only around -10 dB for hi hat. Although analog distortion is more like compression at modest overload levels (often desirable on bottom end), higher frequencies cause saturation even at modest levels (an unpleasant "crunchiness"). Also, VU meters tend to progressively under-read above 1 kHz, due to their sluggish response time. Hi-hats should read about -10 dB on a VU meter, as against 0 dB for a typical snare drum, and +3 dB or more for a kick drum. Peak meters read more-or-less independent of frequency.

Aim for 0 dB recording level for all signals. 3.7 Track sheet When laying out channels for recording or mixing, try to be sensible. Keep toms together, etc. Work out a scheme that suits you and stick to it.

A common order is: kick drum, snare, hi-hat, toms (as the audience sees the kit), cymbals (ditto), bass, guitars, keyboards, other instruments, vocals. From session to session and gig to gig you will soon know where you are without hardly ever having to look at your tracksheet. 3. PRACTICE 17 EURORACK MX1804X 4. APPLICATIONS 4.1 Live gig with simultaneous 2-track recording Here some or all mono channels are likely to be tied up with stage mics. Carefully position these so as to minimize feedback. Try to keep the stage volume as low as possible, as stage sound can interfere with and muddy FOH sound, as well as causing a reduction in feedback thresholds. Don't forget to notch out troublesome frequencies using a graphic (e.g.

our ULTRA-GRAPH PRO GEQ3102) or parametric equalizer (e.g. our ULTRA-Q PRO PEQ2200), or our FEEDBACK DESTROYER DSP1124P. Use the low-cut filters to eliminate floor rumble, mics popping etc. Try using a compressor and noise gate on vocals, bass, guitar and even drums via channel insert. Input Source 1 Vocals 2 Bass Drum 3 Snare Drum 4 Overhead L 5 Overhead R 6 Bass 7/8 Keyboard 1 9/10 Keyboard 2 11/12 Keyboard 3 13/14 Keyboard 4 Aux Return 1 Playback from MTR FX Return Effects Return Routing Mic/Line Mono/Stereo Main Mix Mic Mono Alt 3-4 Mic Mono Alt 3-4 Mic Mono Alt 3-4 Mic Mono Alt 3-4 Mic Mono Main Mix Mic Mono Main Mix Line Stereo Main Mix Line Stereo Main Mix Line Stereo Stereo Stereo Tab. 4.1: Use of the inputs of your MX1804X Output Application Alt 3-4 Drum Submix Aux Send 1 Headphones (pre-fader) FX Send int. Effect (post-fader) Main Mix Recording DAT Control Room out Poweramp. (FOH mix) Tab.

4.2: Use of the outputs of your MX1804X 4.2 MIDI project studio 8-track MIDI project studio with sampler, 8-track recording system, one vocal mic and two effects units: With largely computer-generated music you will want to have plenty of Line inputs, and an ability to take vocals quickly, efficiently, and with minimal desk disturbance. Often a vocal line is added after the music is almost complete. For this we try not to use a valuable aux send as a cue feed. In general, the mix in the artist's headphones can be the same as that going into the control room monitors: basically a stereo mix with 1) the vocal channel raised above the "mix" level in volume and 2) any off-putting channels muted. If you intend to take several tracks in quick succession, you can route the channel via the Alt 3-4 bus simultaneously into all tape tracks via a simple junction box, splitter lead, line mixer like our ULTRALINK PRO MX882, or patchbay, like our ULTRAPATCH PRO PX2000. Note: When using Alt 3-4 to send to tape, you can either audition the signal via the tape recorder track, or by assigning Alt 3-4 to the control room monitors, or both. If you are auditioning the vocalist via both routes, the voice should appear louder to you (and the singer) during a take, but be set properly in the mix during playback. 4.

APPLICATIONS 17 EURORACK MX1804X By a benign twist of fate, this is usually exactly what you (and they) want. Input 1 2 3 4 5 6 7/8 9/10 11/12 13/14 Aux Return 1 FX Return Source Tape Tape Tape Sampler 1 Sampler 2 Sampler 2 Sampler 4 ext. Effect int. Effect Routing Mic/Line Mono/Stereo Alt 3-4 Mic Mono Main Mix Line Mono Main Mix Line Mono Main Mix Line Mono Main Mix Line Mono Main Mix Line Mono Main Mix Line Stereo Main Mix Line Stereo Main Mix Line Stereo Stereo Stereo Tab. 4.3: Use of the inputs of your MX1804X Input Application Recording (multitrack) Alt 3-4 Aux Send 1 ext. Effect FX Send int. Effect Main Mix Recording (DAT) Control Room out Monitor Speaker Tab. 4.4: Use of the outputs of your MX1804X 4.

3 Patchbay A patchbay allows to patch the audio signals of most components in your studio from a central point and send them to other units, which makes your entire cabling better structured and is indispensable for professional work. If you want to use your studio as effectively as possible then it is preferable to use a complete patchbay wiring scheme, but even less sophisticated patchbay solutions will benefit smaller studio configurations.



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4.3.1 Patchbay configuration The majority of commercially available patchbays include two rows with 24 phone jacks each in a 19" 1 U rack panel. On the rear, either a corresponding number of phone jacks or contacts for soldering signal leads can be found. Each group of four of these phone jacks forms one module. The configuration of some Patchbays can be changed by inserting jumpers or turning individual modules. With the help of our ULTRAPATCH PRO PX2000, an easy-to-use 24-patchbay offering phone jacks throughout, you can easily understand the four different modes. With the ULTRAPATCH PRO you can select between the four different operating modes simply by setting a switch on the upper panel (example: module 17): 4.

3.2 Parallel Fig. 4.1: Patchbay mode "parallel" In this mode, all terminals of one module are interconnected. This configuration doesn't make sense at first glance 18 4.

APPLICATIONS EURORACK MX1804X but is used to split up and send one audio signal (e.g. Aux Send) to several destinations (e.g. effects devices).

4.3.3 Half-normalled Fig. 4.2: Patchbay mode "half-normalled" In this configuration, the contacts of the two jacks on the rear are interconnected. When you insert a plug into the upper front jack, the signal routed through the rear path is not interrupted. Only when the lower front jack is used will the rear panel route be split up, so that the two upper and the two lower phone jacks are connected to one another. This configuration is called "input break" and is used mainly for insert paths. So you can easily patch the signal from a mixing console channel at the Patchbay without interrupting the signal flow in the channel.

4.

3.4 Normalled Fig. 4.3: Patchbay mode "normalled" Here, and in contrast to the "half-normalled" setup, the signal route of the rear phone jacks is interrupted when you insert a plug both into the upper and lower front jacks. 4.3.5 Open Fig. 4.4: Patchbay mode "open" This mode is used to connect devices such as sound modules or CD players having no inputs of their own. This saves space, as you can route the left and right outputs to one module (left - top; right - bottom) or patch two devices to one module (top and bottom).

Effects devices and 2-tracks can be configured this way, so the inputs and outputs are positioned on top of each other. Basically, the inputs are routed to the bottom and the outputs to the top rear-wall connectors. Avoid routing digital signals over a patchbay as the pulse signal used for the transmission of such signals causes heavy interference in analog signals. Additionally, normal patchbays change the impedance of the digital cable route, which causes interference in the digital path. Use the BEHRINGER ULTRAMATCH SRC2000 specifically designed for this and other digital signal-related functions.

Microphone inputs operate at a level several orders of magnitude lower than line levels (+4 dBu or -10 dBV). Therefore, they should never be routed via a patchbay. In any case, patching in a field with 48 VDC (phantom power) flying about is to be avoided at all costs. It is best to plug mics directly into the mixing console or via special XLR-type wall boxes connected to the mic inputs of the console by good-quality balanced multicore cables (2-cond. + shield).

4. APPLICATIONS 19 EURORACK MX1804X 4.3.6 Patchbay organization Let us give you an example configuration that shows how you can most effectively use your patchbays. We assume you own a mixing console with 16 mic/line inputs plus inserts, 8 direct outputs, 8 subgroups with 4 inserts, 4 aux paths with 2 stereo returns and one stereo master output including insert jacks. Added to this we have an 8-track recorder (digital or analog), a few pieces of outboard equipment (FX, dynamics & EQ's), a CD player, tape deck, HiFi system and a headphones amp: 1 2 3 4 Fig. 4.1: Example of a studio organization with four patchbays In the first eight modules of patchbay 1 the subgroup outputs are directly connected to the corresponding multitrack inputs. In addition to that it is also possible to record the signals coming from a subgroup on a different track of the multitrack. To save space and provide a clearly structured configuration, the direct outputs are connected both to the top and bottom jacks.

Modules 17 & 18 are the stereo master output, which is halfnormalled and thus allows for recording both to the DAT recorder and the tape deck, simply by patching it accordingly. Modules 19 & 20 (tape deck) are open, because it does not make sense connecting the inputs and outputs of the tape deck. 21 & 22 are normalled and route the DAT recorder outputs to the 2-track inputs of the mixing console. So it always is possible to control the recorded data on the 2-track from the mixing console. The CD player and the HiFi system are connected to modules 23 & 24, which are open, because they only serve as a source.

In patchbay 2 the first 16 modules are normalled (1 through 8 IN could also be used to connect the corresponding monitor inputs--if the console has a separate monitor section). MIDI devices such as samplers, expanders, keyboards, etc. are usually set up in every corner of the room. To make the cabling better structured we route these units to modules 9 through 16. This allows further workmanship of the MIDI devices at the mixing console.

Modules 17 through 20 are normalled and have the FX inputs and the aux sends connected, 21 through 24 are also normalled and are patched to the two stereo aux returns with the FX outputs. 20 4. APPLICATIONS EURORACK MX1804X In patchbay 3, modules 1 through 16 are for the channel insert. These modules are half-normalled, so that you have an additional route for the channel signals. The same applies to the insert paths of the subgroups and the master output.

The headphones amp is connected to 23 & 24, which are normalled and connected to the control room outputs of the mixing console. Of course, you can also use pre-fader aux paths for the headphones mix. Patchbay 4 manages the dynamics and frequency-processing devices in an open configuration (modules 1 through 16). Multigates and Compressors should be used here, in particular. Modules 17 through 24 are used to provide a "parallel split", i.

e. two modules are patched to each other on the rear with one patch cord, so that you can split up a signal applied on the front panel to several destinations. These modules have a parallel configuration. It should be noted that patchbays should be placed one below the other in such a way that the patch cords won't hang all over the patchbays. In our example you don't have to span great distances, for instance, to patch the dynamics and EQ's to the insert paths. 4.3.7

Looming problems Loom wiring is an art unto itself, and it is worth taking time out to get it right. First off, it is important to avoid earth loops (a looped wire acts an aerial, picking up hum and electromagnetic radiation).



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Think of a tree.

Every part of that tree is connected to every other part, but only by one route. That's how the total earth picture for your entire studio should look. Don't take the earth off your power cable plug to reduce audible 50 Hz mains hum. Rather you should be looking at disconnecting the signal screen somewhere (one or several audio cables). It is good practice to ensure that all screens are commoned at the patchbay, in which case all unearthed equipment would pick up earth from this point via a single screen (more than one route = an earth loop), while mains-earthed equipment would have all screens cut at the equipment end. Some quality equipment has an independent signal and mains earth. In this case at least one screen should carry earth to the equipment. Sometimes the only way to find out is "suck and see". Take care to ensure that using the patchbay does not disturb the studio's earth architecture. Always use short as possible patch leads with the screen connected at both ends.

Having designed mains hum out of the system, make up your cable looms from the patchbays outwards, and use cable ties, flexible sheaths, multicores, etc. to keep the back of your racks tidy. 4.4 Expanding When the EURORACK is your main mixer, you may find that you run out of inputs as your system expands. It is possible to expand your mixing system by combining two or more mixers.

Adding extra line inputs to your EURORACK A small line mixer (such as the BEHRINGER ULTRALINK PRO MX882 channel mixer/splitter/signal router) can inexpensively add extra line inputs to your console. With the ULTRALINK PRO, any stereo, line-level input on your EURORACK can become a stereo line input plus a further 6 pan-able mono line inputs. Great for adding tape monitor returns etc. Linking two EURORACKs Simply take the main mix output of one, and feed it into a suitable stereo line input of the second. Linking the EURORACK to a master console Feed any or all of the main mix, Alt 3-4 and aux outputs from your EURORACK into separate channels of the master console.

The aux outputs should be routed only to individual aux send buses on the master console. Now the aux sends from the EURORACK can access effects currently used by the master console. The EURORACK outputs are essentially submixes of several channels of sound, and are therefore likely to be considerably higher than the typical source signals (coming from microphones, MIDI instruments or tape) seen by the remaining channels of the master console or the 2nd EURORACK. 4. APPLICATIONS 21 EURORACK MX1804X 5. TECHNICAL BACKGROUND 5.1 Mixing 5.1.1 Equalization Few people buying a mixer will need to be told how an equalizer works. But how to get the best out of it? Well, that's another story.

In the beginning EQ was an instrument for removing unwanted frequencies, or compensating for imperfect microphone response curves, or bumps in a studio's acoustic. It was a corrective device. Tamla Motown turned that notion upside down in the sixties with the novel idea that you try to find for each instrument a characteristic frequency not shared by the other instruments in the mix. Then you whack up its gain. This makes individual voices punch through a mix in a slightly unnatural but exciting way. In general corrective EQ usually involves broadband (slope) contouring, together with narrowband notching of unwanted resonances. The narrower the notch or "Q", the less the total signal will be affected. Finding bad resonances is made easier by first frequency sweeping in BOOST mode. "Motown" EQ is achieved by applying boost in a fairly broadband way. The broader the band, the more musical but less instrument-specific the effect.

Applying boost over a narrow bandwidth will sound "honky". For sounds which require drastic corrective EQ, it is advisable to have a couple of channels of fully comprehensive Parametric Equalization in your rack. (You can always bounce tracks though the outboard EQ, freeing up the unit for the next task). Check out the BEHRINGER ULTRA-CURVE PRO DSP8024, a superlative digital stereo equalizer and much, much more. Or our ULTRA-Q PRO PEQ2200 5-band constant-Q state-variable analog EQ.

For "advanced equalization", EQ might be applied to a signal as follows: First, trim the LF and HF shelves to achieve the required slope or "loudness". Now use a parametric EQ band to boost the most significant frequency for each instrument or tape track. Over all channels, if two or more of these frequencies coincide, then you might have to settle for second best in some cases, if you want to achieve optimum separation in the mix. Really nasty frequencies will need notching out. A good vocal signal can be enhanced by applying a significant boost in the 12 kHz region or higher, above the nasty sibilance region.

This is especially effective if you've got a de-esser patched post-EQ. + Use the low-cut to tighten up channels in a mix: maybe remove it only for the bass, kick drum, toms, tablas, didgeridoo and other deliberate subsonics (when recording classical music ignore this advice). With the LF set to boost, and the low-cut switch activated, you have pretty much got a peak response rather than shelving at the bottom. Good for tight but deep bass. Remember EQ contouring can be done with cut as well as with boost. Cutting away the top and bottom, then pushing up the gain is equivalent to mid range boost! EQ is not a one way street! Always re set a channel's input gain (or external devices' output level) after altering the amount of desk EQ cut or boost applied. 5.1.2 Gain optimization PFL (Pre-Fader-Listen) is the way to set a desk level. Master aux send levels are fixed at unity gain.

As the mix progresses, more and more channels are likely to be sending to effects via the aux buses, and it's best to PFL all sends just before setting up for the final mix. Outboard reverbs etc. should all be made to work hard. There's no point in having an 85 dB dynamic range if the input meter of your reverb is barely flickering. On the other hand, digital distortion is not one of the nicer noises around. You'll have to rely on your ears to detect digital distortion, since different outboard processors calibrate their meters differently. If you hear distortion, turn down the input on the FX unit, and turn up the desk's aux return input. 99 times out of 100 distortion in the aux send > FX > aux return loop will come from the FX unit (FX gain too high), and the same goes for a high noise level (FX gain too low). 22 5. TECHNICAL BACKGROUND EURORACK MX1804X Analog multitrack tape should be driven quite hard, since its dynamic range (without noise reduction) is likely to be 20 to 30 dB worse than other elements in the recording chain.

Try to record bright. You can always mix back duller. Brightening up an off-tape signal will bring up the level of tape noise. With digital tape or hard disk you have plenty of dynamic range, and treble pre-emphasis is not often necessary.



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*Just don't let the signal distort! When mixing or recording, keep the channel fader levels around or below 0 dB.*

*If you do find the faders creeping up or down, apply a suitable offset over all channel faders, and try to control your bad habit in future!* 6. INSTALLATION  
Your BEHRINGER EURORACK MX1804X was carefully packed in the factory and the packaging was designed to protect the unit from rough handling.  
Nevertheless, we recommend that you carefully examine the packaging and its contents for any signs of physical damage, which may have occurred in transit.

+ If the unit is damaged, please do not return it to us, but notify your dealer and the shipping company immediately, otherwise claims for damage or replacement may not be granted. Shipping claims must be made by the consignee.

6.1 Mains connection The mains connection of the MX1804X is made by using the included power supply unit. It meets all of the international safety certification requirements. + Please make sure that all units have a proper ground connection. For your own safety, it is advisable not to remove the ground connection within the units or at the supply, or fail to make this connection at all. 6.2 Audio connections You will need a lot of cables for different purposes--see the following figures to make sure you have got the right ones. Use custom-made RCA cables for the 2-track in/out traffic (centre post = signal (+ve), sleeve = ground/screen). It is possible to connect unbalanced sources to the balanced inputs. Use either mono jacks or connect the ring and sleeve of the jack (or pin 1 with pin 3 with XLR plugs).

+48 V DC phantom power is also provided, which can be switched on and off with +48 V PHANTOM switch. + Please ensure that only qualified persons install and operate the EURORACK. During installation and operation the user must have sufficient electrical contact to earth. Electrostatic charges might affect the operation of the EURORACK! 6. INSTALLATION 23 EURORACK MX1804X Fig. 6.1: Different connector types 24 6. INSTALLATION

EURORACK MX1804X 7. SPECIFICATIONS Mono input channels Mic input Frequency response Distortion (THD&N) Gain range Max. input Mic E. I.N. (22 Hz - 22 kHz) electronically balanced, discrete input configuration 10 Hz to 60 kHz +/- 3 dB 0.007 % at +4 dBu, 1 kHz, bandwidth 80 kHz +10 dB to +60 dB +12 dBu -129.5 dBu, 150 Ohm source, -117.

3 dBqp, 150 Ohm source, -132.0 dBu, input shorted, -122.0 dBqp, input shorted. electronically balanced 10 Hz to 60 kHz +/- 3 dB 0.007 % at +4 dBu, 1 kHz, bandwidth 80 kHz +10 dBu to -60 dBu +22 dBu 80 Hz, +/- 15 dB 100 Hz to 8 kHz, +/- 15 dB 12 kHz, +/- 15 dB -3 dB at 75 Hz, 18 dB/Okt.

electronically balanced 10 Hz to 60 kHz +/- 3 dB 0.007 % at +4 dBu, 1 kHz, bandwidth 80 kHz +10 dBu to -60 dBu +22 dBu 80 Hz, +/- 15 dB 500 Hz, +/- 15 dB 3 kHz, +/- 15 dB 12 kHz, +/- 15 dB +28 dBu balanced on XLR, +22 dBu unbalanced on jack +22 dBu unbalanced +22 dBu unbalanced -112 dB (all channels open, at unity gain) 24-bit sigma-delta, 64/128-times oversampling 46.875 kHz 60 Hz, 160 Hz, 410 Hz, 1.1 kHz, 2.3 kHz, 6.2 kHz und 15.6 kHz +/- 10 dB U.S.A./Canada U.

K./Australia Europe Japan 115 V ~, 60 Hz, power supply MXUL1 240 V ~, 50 Hz, power supply MXUK1 230 V ~, 50 Hz, power supply MXEU1 100 V ~, 60 Hz, power supply MXJP1 Line input Frequency response Distortion (THD&N) Channel fader range Max. input EQ Low Mid High Low-cut filter Stereo input channels Line input Frequency response Distortion (THD&N) Channel fader range Max. input EQ Low Lo mid Hi mid High Main mix Max. output Aux send max. output Control room output Noise Digital effects processor Converter Sample rate Graphik equalizer Frequencies Max. boost/cut Power supply Mains voltage Dimensions/weight Dimensions (H \* W \* D) Weight approx. 1.58 " / 3.54" (40/90 mm) \* 16.

14" (410 mm) \* 15.16" (385 mm) 6.0 kg (without power supply) BEHRINGER is constantly striving to maintain the highest professional standards. As a result of these efforts, modifications may be made from time to time to existing products without prior notice. Specifications and appearance may differ from those listed or illustrated.

7. SPECIFICATIONS 25 EURORACK MX1804X 8. MODIFICATIONS The following modifications require you to do some soldering. Attempt only if you are experienced in using an iron on PCBs. Otherwise, refer to qualified personnel.

+ After modification the BEHRINGER warranty becomes discretionary. Links should not be threaded into holes on the PCB. They should be soldered to the tinned areas around the holes, and bowed slightly upwards in between. Mono channels: Aux send 2 > pre-fader Mono channel Aux sends 2 are post-fader. If you want to convert them, carry out the modification described below to each mono channel you want to be altered. The right PCB area is indicated by a yellow printing (see figures below). 1) Switch desk off and disconnect it from the mains supply! 2) Cut the "post" track. 3) Add in a "pre" link. Repeat for all mono channels you want to be modified. Modification on Mono Channels AUX PRE AUX PRE Add a 'pre' link Cut the 'post' track JpN POST POST JpN Before After Fig.

8.1: Modifications on mono channels 26 8. MODIFICATIONS EURORACK MX1804X 9. WARRANTY § 1 WARRANTY CARD/ONLINE REGISTRATION To be protected by the extended warranty, the buyer must complete and return the enclosed warranty card within 14 days of the date of purchase to BEHRINGER Spezielle Studioteknik GmbH, in accordance with the conditions stipulated in § 3. Failure to return the card in due time (date as per postmark) will void any extended warranty claims. Based on the conditions herein, the buyer may also choose to use the online registration option via the Internet (www.behringer.com or www.behringer.de).

§ 2 WARRANTY 1. BEHRINGER (BEHRINGER Spezielle Studioteknik GmbH including all BEHRINGER subsidiaries listed on the enclosed page, except BEHRINGER Japan) warrants the mechanical and electronic components of this product to be free of defects in material and workmanship for a period of one (1) year from the original date of purchase, in accordance with the warranty regulations described below. If the product shows any defects within the specified warranty period that are not due to normal wear and tear and/or improper handling by the user, BEHRINGER shall, at its sole discretion, either repair or replace the product. 2. If the warranty claim proves to be justified, the product will be returned to the user freight prepaid.

3. Warranty claims other than those indicated above are expressly excluded. § 3 RETURN AUTHORIZATION NUMBER 1. To obtain warranty service, the buyer (or his authorized dealer) must call BEHRINGER (see enclosed list) during normal business hours BEFORE returning the product. All inquiries must be accompanied by a description of the problem. BEHRINGER will then issue a return authorization number.



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