

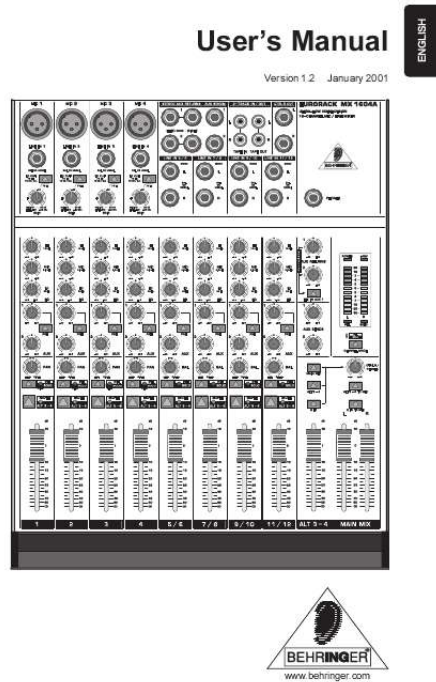


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You can read the recommendations in the user guide, the technical guide or the installation guide for BEHRINGER MX1604A. You'll find the answers to all your questions on the BEHRINGER MX1604A in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual BEHRINGER MX1604A
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EURO RACK® MX1604A



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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 MX1604A 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 MX1604A 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 the 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 all people whose help on Project EURORACK MX1604A has made it all possible. Everybody has made very personal contributions, starting from the designers of the unit via the many staff members in my company to you, the user of BEHRINGER products. My friends, it's been worth the effort! Thank you very much, Uli Behringer 3 EURORACK s Ultra-low noise 12-channel 4-bus mixer s 4 mono input channels with gold plated XLRs s 4 stereo input channels s 2 additional multi-functional stereo aux returns s Pre and post fader aux sends for external effects and monitoring s Master aux sends with gain control s Extremely high headroom offering more dynamic range s Ultra-low noise discrete mic pre-amps with +48 V phantom power s Balanced inputs and main outputs s Peak LEDs and switchable low-cut filter on all mono channels s Ultra-musical 3-band EQ on all channels s Mute / Alt 3-4, Solo-In-Place and Pre-Fader-Listen function on all channels s Separate main mix, control room and headphones outputs s 2-Track inputs assignable to main mix or control room / headphones outputs s Highly accurate bargraph meters on output s High quality 60 mm faders and sealed potentiometers s Rugged design power supply ensures superior transient response EURORACK MX1604A © Ultra-low noise 12 channel, 4-bus mic/line mixer s State-of-the-art 4580 ICs and high quality components ensure crystal-clear audio performance and excellent noise figures s 19" rack mounting kit included s Extremely rugged construction ensures long life even under the most demanding conditions s Manufactured under ISO9000 certified management system MX1604A 4 EURORACK MX1604A TABLE OF CONTENTS 1. INTRODUCTION

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This also sends the Solo/PFL-ed signal to the left and right speakers. For level-setting (as opposed to localized listening) select the mono PFL bus rather than the post-fader (postchannel pan) stereo Solo bus (Channel Mode global 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 Solo/PFL metering, a channel LED illuminates when a channel is going into overload. You do not want the overload light to come on except very intermittently during a take or a mix. If it does light persistently, reduce input gain (see also Section 5: SETTING UP). There is a steep Lo Cut (high pass) filter sives, woolly bottom end etc. , slope at 18 dB/oct. at 75 Hz, for reducing floor rumble, explo- 2.

2 Equalizer All mono input channels are fitted with three-band EQ and the above mentioned switchable Lo 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 , mid 80 Hz respectively. and lower shelving controls have their frequencies fixed at 12 kHz, 2.5 kHz and 2.3 kHz. 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 . Aux Send 2 is always wired post-fader.

For almost all FX send purposes, you will want Aux Sends to be post-fader, so that when a fader level is 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 dont 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 requires 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. + Mono channels may be altered for pre-fader Aux 2 (see Chapter 9.



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4 Modifications). 2. MONO INPUT CHANNEL 9 EURORACK MX1604A 3. STEREO INPUT CHANNEL Each stereo channel comes with two balanced Line level inputs on 1/4" TRS jacks, for left and right signals. When only the left input is connected, the channel operates in mono. 3.

1 Input level setting The stereo inputs are designed for any Line level signal. Most Line level sources such as MIDI instruments and FX units will have their own output level control. Those that don't, for example CD players, all have an output level within the scope of the MX1604A. When the channel and master fader are set to unity gain the meters should read between -4 and +7 dB. Remember that there is 15 dB gain on both the channel as well as master fader. 3.2 Equalizer The stereo input channels are fitted with three-band EQ. The equalizer is has exactly the same parameters as on the mono channels, in stereo. 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. 3.

3 Aux Sends These are the same as for mono channels (see 2.3). Note that a mono sum is taken from the stereo input. 3.4 Routing 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.

For example, with the Balance control turned fully clockwise, only the right portion of the channels 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 Mute / Alt 3-4 is engaged. 4. MAIN SECTION

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. 4.2 Stereo Aux Returns There are two additional stereo Line inputs (Aux Returns 1 and 2) on your MX1604A. Aux Return 1 is permanently assigned to the Main Mix. If you connect a jack to the left socket only, the Aux Return 1 operates in mono. Aux Return 2 can be switched between the Main Mix and the cue feed (Aux Send 1) via a switch marked FX TO AUX 1 . This enables you to provide a wet (signal with effect i.e. reverb) cue mix for the headphones or foldback speakers.

10 3. STEREO INPUT CHANNEL EURORACK MX1604A If no connection is made to Aux Return 2, the signal is normalised (connected directly) to Aux Return 1. Depressing FX TO AUX 1 will then feed the signal from Aux Return 1 into the cue feed (Aux Send 1) and can be controlled in level independently with Aux Return 2. This feature is primarily useful when you are using one effect for the Main Mix and for the foldback speakers. + When using Aux Send 1 as a second (pre-fader) effects send and Aux Return 2 as the effect input, do not engage FX TO AUX 1 . The connection from Aux Return 2 to Aux Send 1 could cause feedback. However, there are exceptions: For instance if you deliberately want to send one effect into another, e.g. delay into chorus etc. The Aux Returns are multi-functional.

They may be used for returning the outputs of effect 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.

When applying short left and right delays, the shortest one will always seem loudest. When pitch shifting up and down in wide stereo to thicken a sound, the signal shifted upwards will seem louder than one that goes down. In both cases use the Balance control to compensate (an analogy comes from Greece: the columns of the Parthenon in Athens are slightly bowed so as to appear straight.) When carrying any stereo imaging exercise, don't just rely on the control room monitors. Get a pair of headphones and listen in stereo and in reverse stereo, just in case you have any significant hearing discrepancies between your ears.

Sometimes an engineer wants to narrow the stereo width of a reverb field. To do this you will have to come back on two mono channels to get independent pan for the left and right signals. 4.3 Metering Main Mix/Solo/PFL level is displayed on a pair of highly-accurate 12-segment bargraph peak meters . Additional LEDs indicate Power On , +48 V Phantom Power present , and whether the mono PreFader-Listen bus or the stereo Solo bus is engaged. 4.4 Channel mode The Channel Mode switch nel Solo buttons. determines whether Solo-In-Place or Pre-Fader-Listen is assigned to the chan- 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. All Solo signals are reconfigured to PFL. PFL should always be used for gain-setting (see also the essential Section 5 SETTING UP). follow whatever source is being auditioned (the meters wont make much sense if more The L/R meters than one source is selected!). Selecting Solo/PFL does not affect the signal from the L/R recording outputs. Just as well, or every time you wanted to do a quick Solo check during a mix, you'd have to start again! 4.5 2-Track input and output Input A 2-Track input, on RCA phono jacks professional audio equipment. , provides easy connection to DAT and other professional or semi2 TK TO CONTROL ROOM routes 11 The 2-Track input is primarily for auditioning mix playback from tape.

4. MAIN SECTION EURORACK MX1604A this signal to the monitors and/or phones. 2 TK TO MIX and will act as an additional input for tape However, it can also be routed to the Main Mix via playback, MIDI instruments etc. Here 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 Section 9.5 Expanding). Output The Main Mix output is delivered by XLR connectors and TRS jacks on the back panel as well as by RCA phono jacks on the front. Level is ultimately determined by a pair of precision faders . 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. 4.6 Monitoring Though most of you will want to audition the Main Mix most of the time include the Alt 3-4 bus and 2-Track playback .



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A single volume control sends the level to the headphones and main monitors there are exceptions. These . If you want to audition external sources very often, you could connect a hi-fi pre-amp (or tape out) to your 2-Track input, allowing you to monitor a variety of extra sources such as vinyl, cassette, CD etc. 4.7 Alt 3-4 output By depressing the Mute button Mix. a channels output will be routed to the Alt 3-4 output instead of the Main . Use to have the Signal Level to the Alt 3-4 outputs (TRS jacks on the back panel) is adjusted by PFL-ed (and up).

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. @@They are also used to route to multitrack recorders . There are no fully-fledged subgroups on the MX1604A. @@@@Engaging mute on any input channel routes to the Alt 3-4 bus. @@@@4. @@@@Many controls have a natural initial setting. For EQ cut and boost this is centre position. @@@@Do not connect mics with Phantom Power switched on. @@@@2) Set EQ to flat (all knobs at 12 oclock). 3) Where applicable, set Lo Cut switch frequency content. 4) Set channel mode to PFL 5) Depress Solo/PFL . switch. @@roll the tape. @@@@Continuous signals should not exceed 0 dB. 4) If EQ is used, repeat steps 1 - 3. @@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 processors output level so that effected and bypassed signals are of comparable level, i.e. unity gain. 6) Solo/PFL switch UP. Move onto next channel. 5. SETTING UP 13 EURORACK MX1604A 5.5 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. 5.

6 Recording levels When recording to digital, its a good idea to keep the recorders peak meters below 0 dB. Most (not all, esp. samplers) read 0 dB with some headroom left. This is because, unlike with analogue, 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 for instance 16-bit digitals 96 dB dynamic range), youll 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 or digital multitrack recorder reference. But your DAT or multitrack recorder 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 havent. When recording to analogue, the tape machines VU meters should show around +3 dB on bass, but only around -10 dB for hi hat. Although analogue distortion is more like compression at modest overload levels (often desirable on bottom end), higher frequencies cause saturation even at modest levels (resulting in 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.

5.7 Track sheet When laying out channels for recording or mixing, try to be sensible. Keep tom-toms together, etc. Work out a scheme that suits you and stick to it. A common order is: kick drum, snare, hi-hat, tom-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. 6. APPLICATIONS Experience tells us that the cables in a studio environment get tangled very quickly (inviting mistakes). A patchfield will facilitate patching and repatching considerably. The BEHRINGER ULTRAPATCH PRO PX2000 makes patching easier and trouble free, increasing both ergonomics and productivity. 6.1 Keyboard mixing, live or in the studio This is relatively simple to achieve. Simply use the Line inputs to mix stereo or mono outputs from your keyboards. It may be useful to use the Alt 3-4 outs e.g.

to control the level of drums versus music. Aux Sends may be used either to feed on-stage monitors, artists headphones or effects units. The Main Mix output should feed the FOH or studio mixer. A typical comprehensive live setup is shown below. 14 6. APPLICATIONS EURORACK MX1604A Keyboard mixing Mic/Line Mono/Stereo Input Line Mono 1 Line Mono 2 Line Mono 3 Line Mono 4 Line Stereo 5-6 Line Stereo 7-8 Line Stereo 9-10 Line Stereo 11-12 Stereo Aux 1 Stereo Aux 2 > Effect (post-fader) > Effect (post-fader) > Compressor > FOH > Compressor > FOH > Personal foldback (main stereo feed) Source MIDI instrument #1 MIDI instrument #2 MIDI instrument #3 MIDI instrument #4 MIDI sampler #1 MIDI sampler #2 MIDI synth #1 MIDI synth #2 Effects unit #1 Effects unit #2 Aux out 1 Aux out 2 Main Mix out L Main Mix out R Monitor out L Tab. 6.1: MX1604A Example Keyboard mixing 6.2 Live gig with simultaneous 2-TK 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. Dont forget to notch out troublesome frequencies using a Graphic or Parametric Equalizer, or Feedback Destroyer (see the BEHRINGER ULTRACURVE PRO DSP8024 or the FEEDBACK DESTROYER PRO DSP1100P, which do all of these and more). Use the Lo Cut filters to eliminate floor rumble, mics popping etc. Live Gig with 2-TK Recording Routing Mic/Line Mono/Stereo Main Mix Main Mix Alt 3-4 Alt 3-4 Alt 3-4 Main Mix Main Mix Mic Mic Mic Mic Line Line Line Line Mono Mono Mono Mono Stereo Stereo Stereo Stereo Stereo Stereo Source Input 1 2 3 4 5-6 7-8 9-10 11-12 Aux 1 Aux 2 Vocals Backing Vocals Bass Drum Drum Overhead Guitar Bass Keyboard #1 Keyboard #2 Effects Intro Tape Alt 3-4 out (Instruments) Aux out 1 Aux out 2 Main Mix out L Main Mix out R Monitor out L Monitor out R > > > > > > 2-Track input Cue 1 (pre-fader) Effect (post-fader) Recording (DAT L) Recording (DAT R) Graphic EQ > FOH Graphic EQ > FOH Tab. 6.

2: MX1604A Example Live gig with 2-TK recording Switching logic for this setup is: and up, and down and down for channels 3 - 8. 6. APPLICATIONS 15 EURORACK MX1604A 6.



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3 Project studio laying vocals to tape 8-track MIDI project studio with sampler, 8-track recording system, one vocal mic and two effects units: Project Studio, laying vocals to tape Source Routing Mic/Line Mono/Stereo Vocals Alt 3-4 M Mono Tape Main Mix L Mono Tape Main Mix L Mono Tape Main Mix L Mono Sampler #1 Main Mix L Stereo Sampler #2 Main Mix L Stereo Sampler #3 Main Mix L Stereo Sampler #4 Main Mix L Stereo Effects #1 Stereo Effects #2 Stereo MX 882 Mix out > 2-Track Input (S33 up, S36 down) Alt 3-4 out > available for track-laying Aux out 1 > Effect 1 Aux out 2 > Effect 2 Main Mix out L > Recording (DAT L) Main Mix out R > Recording (DAT R) Monitor out L > Control Room / Headphones amp Monitor out R > Control Room / Headphones amp Input 1 2 3 4 5-6 7-8 9-10 11-12 Aux 1 Aux 2 Tab. 6.

3: MX1604A example Project studio, laying vocals to tape Switching logic for this setup is: and up, , and down, down in channel 1. 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 artists 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 MX882, or patchbay. 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. By a benign twist of fate, this is usually exactly what you (and they) want. Note that there are 2 Aux Sends and 2 stereo Aux Returns.

If you want to use more than 2 effects units, these can either be 1) patched across insert points, 2) inserted between the samplers outputs and desk inputs, or 3) driven from the channel insert. If you have invested in the 8-channel BEHRINGER ULTRALINK PRO MX882 for tape monitoring purposes, you can turn the 2-TK input into 8 line inputs for accepting stereo or mono effects or synths etc. during mixdown. 16 6. APPLICATIONS EURORACK MX1604A Fig. 6.4:

Project studio setup example 7. SOME MIXING TOPICS 7.1 Equalization The variable parameters of the channel equalizers on the EURORACK are described in sections 2.2 and 3.

2. Few people buying a mixer will need to be told how an Equalizer works. But how to get the best out of it? Well, thats another story. In the beginning EQ was an instrument for removing unwanted frequencies, or compensating for imperfect microphone response curves, or bumps in a studios 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. 7. SOME MIXING TOPICS 17 EURORACK MX1604A 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 youve got a de-esser patched post-EQ. + Use the Lo 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 Lo 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 reset a channels input Gain (or external devices output level) after altering the amount of desk EQ cut or boost applied.

7.2 Gain optimization PFL (Pre-Fader Listen) is the way to set a desk level. Setting up the channel input Gain is discussed in the essential section 5. 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 its best to PFL all sends just before setting up for the final mix.

Outboard reverbs etc. should all be made to work hard. Theres 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. Youll 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 desks 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). Noisy FX (or synth) returns can be greatly improved by the addition of single-ended noise reduction between FX output and Aux (or channel) Returns. The BEHRINGER DENOISER SNR2000 is ideally suited for this purpose. Using analogue single-ended noise reduction can help warm the sound of certain digital reverbs which sound too cold/metallic, and also give that Echoplex sound to digital delay decays.



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Analogue multitrack tape should be driven quite hard, since its dynamic range (without noise reduction) is likely to be 20-30 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.

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! 8. CONNECTIONS 8.1 EURORACK MX1604A connections Follow us on a walk along the rear panel of your EURORACK, starting left: AC Power In. For connecting the mixer to the Power Supply Unit (PSU). Always connect

mixer and PSU before you connect the PSU to the mains supply. Power switch Once the PSU is connected to the mains supply, you may switch on your EURORACK. Allow 1 minute after powering up for the system to equilibrate before setting input gains. 18 8. CONNECTIONS EURORACK MX1604A

Phantom Power switch When using capacitor mics, +48 V DC can be switched globally on or off for all mic channels (also see Mic inputs).

Care should be taken not to plug mics into the console (or stagebox) while the Phantom Power is on. Also, mute the Monitor/PA speakers when turning Phantom Power on or off. + Lets now have a look at all the inputs and outputs on the EURORACK. Most of them are balanced. Unbalanced equipment may be connected to balanced inputs/outputs.

Either use mono 1/4" jacks or connect ring and sleeve of TRS jacks (or leave pin 3 of XLR plugs unused). Main outputs (XLR) Balanced XLR, wired pin 1 ground/screen, pin 2 hot (+ve), pin 3 cold (-ve). Maximum level is +28 dBu. Main output level switch Level to the XLR Main outputs (+4 dB) will be lowered to mic level, if you depress route the lowered output signal directly to the Mic inputs of another console. Main output (TRS sockets) Unbalanced 1/4" TRS sockets, wired tip = signal, sleeve = ground/screen.

Alt 3-4 output Unbalanced 1/4" TRS sockets, wired tip = signal, sleeve = ground/screen. Serial Number Please take the time to fill out and return the warranty card within 14 days from the date of purchase, so as to be entitled to benefit from our extended warranty. Or use our online registration option available on the Internet at www.behringer.com. Let us now move onto the front panel of your EURORACK MX1604A. Mono input channels 1 - 8 Mic inputs Balanced XLR, wired pin 1 = ground/screen, 2 = hot (+ve), 3 = cold (-ve). Remember the Phantom Power switch. Line inputs Balanced 1/4" TRS sockets, wired tip = hot (+ve), ring = cold (-ve), sleeve = ground/screen. Stereo input channels 9/10 - 15/16 Four stereo pairs.

Balanced 1/4" TRS sockets, wired tip = hot (+ve), ring = cold (-ve), sleeve = ground/ screen. Stereo Aux Returns 1/2 Two stereo pairs. Unbalanced 1/4" TRS sockets, wired tip = signal, sleeve = ground/screen. Aux Sends 1/2 Unbalanced 1/4" TRS sockets, wired tip = signal, sleeve = ground/screen. 2-Track in / out RCA sockets for use with tape recorders etc., signal = Main Mix. Control Room outputs Will feed a pair of speakers (via an amp, of course unbalanced 1/4" TRS sockets, wired tip = signal, sleeve = ground/screen. Phones outputs Will feed headphones. 1/4" TRS socket, wired tip = left signal, ring = right signal, sleeve = ground/ screen. .

E.g. you can 8.2 Connections You will need a lot of cables for different purposes see the following figures to make sure you have got the right ones.

Unbalanced equipment may be connected to balanced inputs/outputs.

Either use mono 1/4" jacks or connect ring and sleeve of TRS jacks. 8. CONNECTIONS 19 EURORACK MX1604A Fig. 8.1: Headphones plug Unbalanced use of mono 1/4" jack plugs Tip = Signal Balanced use of stereo 1/4" jack plugs Tip = hot (+ve) Ring = cold (-ve) Sleeve = Ground / Shield Sleeve = Ground / Shield Tip Sleeve Strain relief clamp Tip Ring Sleeve Strain relief clamp For connection of balanced and unbalanced plugs, ring and sleeve have to be bridged at the stereo plug.

Balanced use with XLR connectors 2 1 3 1 = Ground / Shield 2 = hot (+ve) 3 = cold (-ve) 1 2 3 Output Input For unbalanced use pin 1 and pin 3 have to be bridged Fig. 8.2: Different plug types 20 8. CONNECTIONS EURORACK MX1604A + Care should be taken NOT to plug mics into the console (or stagebox) while the Phantom Power is on. Also, mute the monitor/PA speakers when turning Phantom Power on or off. Allow the system to adjust for a couple of seconds after engaging phantom power before setting input gains. 8.3 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.

) Think of a tree. Every part of that tree is connected to every other part, but only by one route. Thats how the total earth picture for your entire studio should look. Dont take the earth off your power cable plug to reduce audible 50 Hz mains hum (or its harmonics). Rather you should be looking at disconnecting the signal screen somewhere. A good suggestion is to ensure that all screens are commoned at the mixer. All unearthed equipment would pick up earth from this point via a single screen (more than 1 route = an earth loop), while mains-earthed equipment would have all screens cut at the equipment end. Keep both the earth and screen connected at the amplifier. The MX1604A will then be earthed via the amplifier. This wiring method is certainly not the only one but it usually works best.

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 to experiment. Take care to ensure that using the patchbay does not disturb the studios earth architecture. Always use short as possible patch leads with the screen connected at both ends.

If youre really serious about hum levels, you could run balanced lines wherever appropriate. The earth wiring scheme would be the same as before. By shorting the ring to the sleeve for all balanced jack sockets connected to unbalanced equipment, you could use balanced patch leads throughout. There is no benefit in wiring a balanced output to a balanced input with a mono patch cord. 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. Its going to get very busy in there, and loose cables will inevitably mean lost signals. Possibly even lost equipment! 8. CONNECTIONS 21 EURORACK MX1604A 9. APPENDIX 9.1 Specifications Input channels Mic input Frequency response Distortion (THD&N) Mic E.



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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 -129.

5 dBu, 150 Ohm source -117.3 dBq, 150 Ohm source -132.0 dBu, input shorted -122.0 dBq, input shorted +10 dB to +60 dB 113.6 dB electronically balanced 10 Hz to 60 kHz, +/- 3 dB 0.007% at +4 dBu, 1 kHz, bandwidth 80 kHz +10 dBu to -40dBu unbalanced 10 Hz to 55 kHz +/- 3 dB 0.007 % at +4 dBu, 1 kHz, bandwidth 80 kHz 12 kHz +/- 15 dB 2.5 kHz +/- 15 dB 80 Hz +/- 15 dB Bus noise, fader 0 dB, channels muted: -100.0 dBr (ref.: +4 dBu), fader 0 dB, all input channels assigned and set to Unity Gain: -88.

5 dBr (ref.: +4 dBu) +22 dBu balanced XLR, +22 dBu unbalanced, 1/4" jacks Off to Unity to +20 dB +22 dBu USA/Canada U.K./Australia Europe Japan 115 V ~, 60 Hz, Power Supply MXUL2 240 V ~, 50 Hz, Power Supply MXUK2 230 V ~, 50 Hz, Power Supply MXEU2 100 V ~, 60 Hz, Power Supply MXJP2 Gain range SNR Line input Frequency response Distortion (THD&N) Sensitivity range Stereo input channels Line input Frequency response Distortion (THD&N) Equalization Hi shelving Mid bell Lo shelving Main Mix Section Noise Max output Aux Returns gain range Aux Sends max out Power Supply Mains voltage Physical Dimensions (H * W * D) Net weight Shipping weight app. 1/3" / 3 1/8" (34 mm / 79 mm) * 11 1/2" (290 mm) * 14 1/2" (368 mm) app.

3,9 kg (PSU not included) app. 6 kg 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 further notice. Specifications and appearance may differ from those listed or shown.

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APPENDIX EURORACK MX1604A 9.2 Block diagram 9. APPENDIX 23 EURORACK MX1604A 9.3 Front & back panels 24 9. APPENDIX EURORACK MX1604A 9.4 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 channel 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. Fig. 9.1: Modification 9.

5 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 8+2 channel Mixer/Splitter/Signal Router) can inexpensively add extra line inputs to your console. With the ULTRALINK, any stereo, line-level input on your EURORACK can become a stereo Line input plus a further 6 panable 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 9.

APPENDIX 25 EURORACK MX1604A considerably higher than the typical source signals (coming from mics, MIDI instruments or tape) seen by the remaining channels of the master console or the 2nd EURORACK. A usefull feature here is the 20 dB pad buttons on the back panel. These buttons enable you to feed the balanced output of the MX1604A to the Mic input of another console. This way it is possible to make for instance a separate keyboard or drum kit mix and feed that to the front of house console (without having to use XLR to jack adapters to feed the line inputs which may also be unbalanced). 26 9.

APPENDIX EURORACK MX1604A 10. 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 Studiotechnik 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 Studiotechnik 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. 2.

@@3. Shipments without freight prepaid will not be accepted. § 4 WARRANTY REGULATIONS 1. @@@@2. @@The warranty does not cover any such modification/adaptation, irrespective of whether it was carried out properly or not.

Under the terms of this warranty, BEHRINGER shall not be held responsible for any cost resulting from such a modification/adaptation. 3. Free inspections and maintenance/repair work are expressly excluded from this warranty, in particular, if caused by improper handling of the product by the user. This also applies to defects caused by normal wear and tear, in particular, of faders, potentiometers, keys/buttons and similar parts. 4. Damages/defects caused by the following conditions are not covered by this warranty: s misuse, neglect or failure to operate the unit in compliance with the instructions given in BEHRINGER user or service manuals.



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s connection or operation of the unit in any way that does not comply with the technical or safety regulations applicable in the country where the product is used. s damages/defects caused by force majeure or any other condition that is beyond the control of BEHRINGER. 5. Any repair or opening of the unit carried out by unauthorized personnel (user included) will void the warranty.

6. If an inspection of the product by BEHRINGER shows that the defect in question is not covered by the warranty, the inspection costs are payable by the customer. 7. Products which do not meet the terms of this warranty will be repaired exclusively at the buyers expense. BEHRINGER will inform the buyer of any such circumstance. If the buyer fails to submit a written repair order within 6 weeks after notification, BEHRINGER will return the unit C.O.D. with a separate invoice for freight and packing. Such costs will also be invoiced separately when the buyer has sent in a written repair order.

§ 5 WARRANTY TRANSFERABILITY This warranty is extended exclusively to the original buyer (customer of retail dealer) and is not transferable to anyone who may subsequently purchase this product. No other person (retail dealer, etc.) shall be entitled to give any warranty promise on behalf of BEHRINGER. §

6 CLAIM FOR DAMAGES Failure of BEHRINGER to provide proper warranty service shall not entitle the buyer to claim (consequential) damages. In no event shall the liability of BEHRINGER exceed the invoiced value of the product.

§ 7 OTHER WARRANTY RIGHTS AND NATIONAL LAW 1. This warranty does not exclude or limit the buyers statutory rights provided by national law, in particular, any such rights against the seller that arise from a legally effective purchase contract. 2. The warranty regulations mentioned herein are applicable unless they constitute an infringement of national warranty law. The information contained in this manual is subject to change without notice.

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