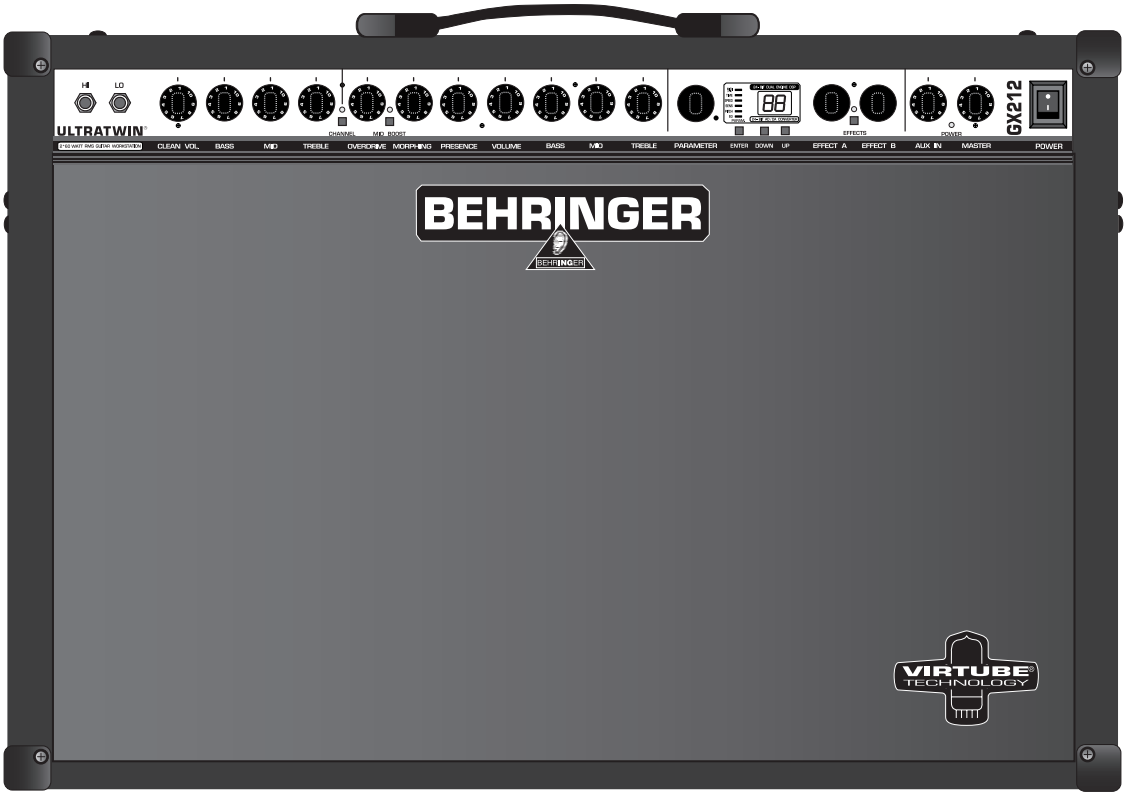
ENGLISH

GX212

ULTRATWIN®

User's Manual

Version 1.0 May 2001



BEHRINGER

INSTRUMENT AMPLIFICATION

SAFETY INSTRUCTIONS

CAUTION: To reduce the risk of electrical shock, do not remove the cover (or back). No user serviceable parts inside; refer servicing to qualified personnel.

WARNING: To reduce the risk of fire or electrical shock, do not expose this appliance to rain or moisture.

This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure – voltage that may be sufficient to constitute a risk of shock.

This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Read the manual.

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 ventilaton. 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 appliances (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 which is described in the Operating Instructions. All other servicing should be referred to qualified service personnel.

FOREWORD

Dear Customer,

Welcome to the team of ULTRATWIN users and thank you very much for expressing your confidence in BEHRINGER products by purchasing the GX212.

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 present you with a really out-of-the-ordinary guitar workstation, which fully satisfies your and our expectations and delivers a superior sound quality, easy operation and technical specifications. In addition to that the guitar workstation is affordable for almost every musician.

The task to design the ULTRATWIN 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 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 possible to produce such high-grade devices at such unbelievably low prices. The answer is quite simple: it's you, our customers! Many satisfied customers, mean 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 ULTRATWIN GX212" has made it all possible:

- The existing users of BEHRINGER equipment, whose comments and suggestions have made them the most important members of the BEHRINGER design team,
- Jan, whose passionate work has made the ULRATWIN a revolutionary vintage guitar workstation,
- Thorsten who designed this marvelous manual,
- Volker for the fine mechanics,
- and all the others, who have made very personal contributions.

My friends, it's been worth the trouble!

Thank you very much,

Uli Behringer

ULTRATWIN®

Ultra-flexible 2 x 60 Watt Guitar Workstation with Digital Multi-Effects Processor

- ▲ Powerful 2 x 60 Watt RMS Guitar Workstation with authentic VIRTUBE® tube emulation
- ▲ Two original 100 Watt heavy duty SHARK 12" guitar speakers model 12G100A
- ▲ Two independent channels with separate volume controls, EQ and effects
- ▲ CLEAN channel delivers clean and slightly distorted tube sounds
- ▲ OVERDRIVE channel offers a broad range, from modern crunch to high-gain sounds
- ▲ Unique Morphing control allows blending between various distortion characteristics
- ▲ Dedicated vintage-type 3-band EQ
- ▲ 24-bit stereo multi-effects processor with ultra-high resolution 24-bit AD/DA converters
- ▲ 31 original VIRTUALIZER®/MODULIZER® presets with world-class effects such as Reverb, Delay, Phaser, Chorus, Flanger, Pitch Shifter, Speaker Simulator, Rotary Speaker, Magic Drive, Compressor, Expander, Wah, Tube Emulator and various effect combinations
- ▲ 99 outstanding and easy-to-edit user presets
- ▲ Quasi-analog operation: three FX parameters per preset can be edited with dedicated controls
- ▲ Adjustable aux and tape input for playback or other line-level signals (e.g. CD player, drum computer, etc.)
- ▲ Frequency-corrected stereo line output for recording and live applications
- ▲ Additional speaker outputs
- ▲ Insert facility for external effects devices (stomp boxes, wah-wah pedals, etc.)
- ▲ Channel select and effect bypass footswitch FS112 included
- ▲ Complete MIDI implementation for channel and effect selection as well as real time control
- ▲ Master volume control and frequency-corrected stereo headphones output
- ▲ Extremely rugged construction ensures long life, even under the most demanding conditions
- ▲ Robust power supply ensures excellent transient response
- ▲ Manufactured under ISO9000 certified management system

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WARNING!

☞ **It should be pointed out, that extreme output volumes may damage your ears and/or your headphones. Turn down all LEVEL controls before you switch on the unit. Always pay attention to an <u>appropriate</u> volume.**

1. INTRODUCTION

Thank you very much for expressing your confidence in BEHRINGER products by purchasing the ULTRATWIN GX212. With the ULTRATWIN, you have acquired a modern guitar workstation that sets new standards in guitar amp engineering. When developing the GX212, our top objective was to reproduce the authentic sound of classic guitar amps as perfectly as we could and combine it with latest DSP technology – while focusing on a user interface that can be operated intuitively.

BEHRINGER is an audio engineering company that has been successfully developing products for studio and live applications for many years now. Our range of products includes microphones and a variety of 19" devices (compressors, enhancers, gates, tube processors, headphone amps, digital effects devices, DI boxes, etc.) as well as various monitoring and P.A. speakers plus professional live and recording consoles. The name of BEHRINGER stands for no-compromise quality, fully-featured products and exemplary service – even years after purchase – as well as sensationally low prices, which allow any ambitious music lovers to make their musical dreams come true.

We also set great store by flexibility, which has become a particularly important factor in the music business over the past few years. Modern guitarists need to offer a broad range of sounds, but should still be able to play in different kinds of applications at short notice: home recording, studio, live concerts. For this reason, it has always been our prime concern to give you a guitar workstation that offers you a complete set of functions, but can still be operated intuitively and quickly – no matter what kind of style you play.

Unfortunately, conventional guitar amps are often not fully designed and developed. Moreover, many manufacturers of traditional-style guitar amps are somewhat afraid of using state-of-the-art technology. The ULTRATWIN, on the other hand, is a pioneering guitar amp that has considerably more functions than any conventional 2-channel amp with a built-in spring reverb. Still, you can use the GX212 so that it mimics an excellently sounding 2-channel combo amp with an – admittedly – good spring reverb (except for that “shatter” sound when the amp gets knocked over). However, we recommend that you make yourself familiar with the ULTRATWIN in full detail, so that you know what each of the many functions does and be able to fully exploit the numerous effects and control options provided.

As technology advances, you’ve got to keep track of latest technological breakthroughs to avoid falling by the wayside. We, too, have continuously improved this amp and included many of your valuable suggestions. We have spared neither expense nor effort to test different types of circuitry and speakers until the results gave us complete satisfaction. After all, we really want to give you fully designed and developed products that meet your expectations in every respect. The ULTRATWIN shall be a useful tool for years to come, which is why we’ve equipped the effects modules of our guitar workstation with EPROMS that can be updated. In this way, we can keep working on new algorithms and considering your ideas and suggestions. The resulting software updates will be made available for free on the Internet, so as to ensure that your amp will never be outdated.

We’ve packed our entire experience into this latest generation of guitar amps. Many people contributed to this project of intense development: studio musicians, collectors of vintage guitar amps, music and guitar lovers alike. We even invited guitar amp tuning experts to help us develop an amplifier that gives you the best of all worlds:

- ▲ Sophisticated analog technology with a “feel factor” only analog technology can provide.
- ▲ Perfect simulation of tube-specific nuances to make up for the drawbacks encountered in tube designs (short service life, heat dissipation, poor mechanical stability).
- ▲ Latest DSP technology to give you a broad range of modern high-gain and vintage-type effect sounds.
- ▲ Rugged and solid construction which even withstands roughest handling.
- ▲ Intuitive operation, so that you can focus your mind on what is most important to you: your music!

☞ **This manual first describes the terminology used, so that you can fully understand the ULTRATWIN and its functions. Please read the manual carefully and keep it for future reference.**

1.1 Design concept

The philosophy behind BEHRINGER products guarantees a no-compromise circuit design and employs the best choice of components. The operational amplifiers used in the ULTRATWIN are exceptional: they boast extreme linearity and very low distortion characteristics. To complement this design, the choice of components include low-tolerance resistors and capacitors, high-quality potentiometers and several other stringently selected elements.

The ULTRATWIN uses SMD technology (Surface Mounted Device). These subminiature components adapted from aerospace technology allow for an extreme packing density to further improve the overall reliability.

The super-robust steel-plate enclosure of your ULTRATWIN, with its generously dimensioned power supply, ensures that your GX212 will never fail on the stage – even when the going gets tough. The enclosure is made of high-grade and non-polluting E1-MDF wood, which consists of multiple tongued/glued layers and is absolutely free of formaldehyde.

1.1.1 VIRTUBE technology

Tube preamps usually employ three to five triode stages in a series configuration, producing different degrees of distortion, dynamic compression and frequency response modification. In addition to the characteristic curve that determines the signal distortion, the order of filter and distortion stages also plays an important role. While you can enhance the sound of clean and slightly distorted signals by adding some bass before feeding them into the distortion stage, the same equalization will lead to a “fuzz”-like, undifferentiated sound with hi-gain signals. For this reason, tube amplifiers have some sort of passive and usually straightforward filter circuitry installed between the single preamp stages. Using these filters you can determine which frequencies will have an impact on the signal distortion.

Additionally, filter circuits following the distortion stage serve to provide for an optimum blend of generated upper harmonics in the output signal. Our VIRTUBE circuits have been designed to accurately simulate this complex interaction with solid-state components. The EQs and filters between the single stages are modeled on the circuitry found in classic tube amps. The non-linear characteristic curves are simulated by means of specially selected diodes. The result is an amplifier whose sounds feature a pronounced tube character.

1.1.2 Morphing

The BEHRINGER ULTRATWIN amplifiers are equipped with a special circuit that gives you enormous flexibility using the overdrive channel. Owing to the rich upper harmonics spectrum of distorted sounds, the subsequent filter circuits have quite a drastic effect on the overall sound, which is why it seemed only natural to allow for a variety of creative filter options.

Therefore, the BEHRINGER morphing circuit uses a tunable filter in addition to a classic 3-band EQ and dedicated presence control. This filter allows you to create new sound nuances that would be impossible with traditional passive EQs. Add to this the mid boost button, the overdrive control, the musically aligned presence control and the passive 3-band EQ, and you’ll have a range of fantastic options available to tailor the sound perfectly to your personal needs.

1.2 Before you begin

Your BEHRINGER ULTRATWIN was carefully packed in the factory and the packaging is 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 during transit.

☞ **If the unit is damaged, please do not return it to BEHRINGER, 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.**

Be sure that there is enough space around the unit for cooling and please do not place the ULTRATWIN on high temperature devices such as radiators etc. to avoid overheating.

☞ **Before you connect your ULTRATWIN to the mains, please make sure that your local voltage matches the voltage required by the unit!**

The mains connection of the ULTRATWIN is made by using the enclosed mains cable and a standard IEC receptacle. It meets all of the international safety certification requirements.

☞ **Please make sure that all units have a proper ground connection. For your own safety, never remove or disable the ground conductor of the unit or of the AC power cable.**

The MIDI connection (IN) is made over standardized DIN plug-in connectors. An optocoupler has been used for isolated data communications.

You will find additional information in chapter 5 “INSTALLATION”.

1.3 Control elements

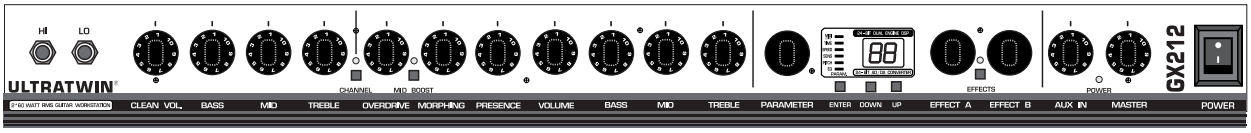

Fig. 1.1: The front panel of the ULTRATWIN GX212

The BEHRINGER ULTRATWIN GX212 features 16 controls, six push-buttons and one 2-digit, 7-segment LED display on its front panel. Additionally, there are two 1/4" jacks for input.

1.3.1 Front panel

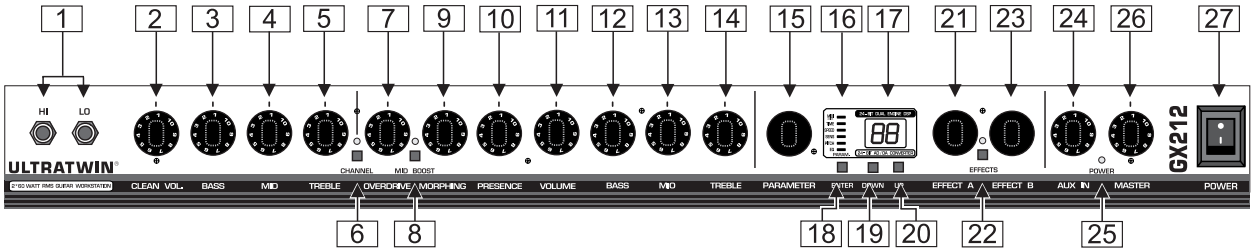

Fig. 1.2: The front panel control elements

1 These are the ULTRATWIN’s *1/4" PHONE JACK INPUTS* to which you can connect your guitar. The HI INPUT has been designed for low-output guitars (e.g. those equipped with single coil pickups), while the LO INPUT should be used for guitars with very high output power (e.g. guitars with humbuckers). Use a commercial 1/4" mono cable (please no DIY (**D**o **I**t **Y**ourself), better ask your specialized retailer), with good mechanical and electrical shielding, so as to avoid unpleasant surprises during rehearsals or concerts.

2 The CLEAN channel’s *CLEAN VOLUME* control determines the volume of the clean channel.

3 The *BASS* control in the EQ section allows you to boost or cut the bass frequencies in the CLEAN channel.

4 With the *MID* control you can boost/cut the midrange frequencies in the CLEAN channel.

5 The *TREBLE* control adjusts the CLEAN channel’s upper frequency range.

☞ **Please note that with all three EQ controls in the CLEAN channel set fully to the left, there will be no signal sent to the speaker, which is due to the classical and extremely efficient EQ circuit used in the ULTRATWIN.**

6 Press the *CHANNEL* button to toggle between the CLEAN and OVERDRIVE channels. When the OVERDRIVE channel is on, the associated LED lights up.

7 Use the *OVERDRIVE* control to determine the degree of distortion in the OVERDRIVE channel.

8 The *MID BOOST* button allows you to raise the midrange frequencies in the OVERDRIVE channel. When the button is on, the associated control LED lights up.

9 Use the *MORPHING* control to crossfade between the various distortion characteristics available.

10 The *PRESENCE* control allows you to boost/cut the high midrange frequencies of the OVERDRIVE channel.

11 The *VOLUME* control adjusts the volume of the OVERDRIVE channel.

☞ **Use both VOLUME controls to optimize the volume ratio of the two channels, so that no volume differences can be heard when switching from one channel to the other. This setting is also effective on the level-dependent digital effects!**

12 The *BASS* control in the EQ section allows you to boost/cut the bass frequencies in the OVERDRIVE channel.

13 With the *MID* control you can boost/cut the midrange frequencies in the OVERDRIVE channel.

14 The *TREBLE* control adjusts the OVERDRIVE channel's upper frequency range.

☞ **Please note that with all three EQ controls in the OVERDRIVE channel set fully to the left, there will be no signal sent to the speaker, which is due to the classical and extremely efficient EQ circuit used in the ULTRATWIN.**

15 The *PARAMETER* control allows you to edit one effect-specific parameter. Once selected with the PARAMETER control, its value is displayed and the associated LED lights up (see 16).

16 The *STATUS* LEDs inform you about the type of parameter you can edit with the PARAMETER control (an exception being the MIDI LED).

▲ MIDI: This LED lights up when you press both UP and DOWN buttons for about two seconds. Subsequently, you can use these buttons to set up a MIDI channel for MIDI data reception (1 through 16, "ON" = Omni and "OF" = off, or "ON" = Omni and 1 through 16 plus one decimal point each = Store Enable mode, see chapter 3.2.1). Press the ENTER button to confirm your selection. The MIDI LED flashes as soon as MIDI data is being received.

☞ **The Store Enable mode (see chapter 3.2.1) allows you to store presets directly via MIDI. Please note that by sending MIDI control #18 values, any changes made to the currently active preset will be permanently stored.**

☞ **Whenever the multi-functional MIDI LED flashes and the unit is not in edit mode, this indicates that the DSP module's output level is close to distortion. In this case, you should turn down the VOLUME control a bit.**

▲ TIME: This LED lights up when you select a time-domain effect parameter (e.g. reverb or delay time).

▲ SPEED: This LED lights up for all modulation effects and indicates the LFO speed (low-frequency oscillator) or the speed parameter of compress/expander.

▲ SENS: This LED informs you that you can adjust the sensitivity of effects such as Auto-Wah, Expander, Compressor.

▲ PITCH: This LED lights up when you edit the pitch shifter, and shows the detune factor, either in semi-tones or cents.

▲ EQ: This LED lights up when you edit the parameters of a filter-based effect.

The built-in effects module features 31 different effect groups and includes a total of 99 effect variations.

17 The *DISPLAY* reads either the program number of the selected preset or the value of the parameter selected with the PARAMETER, EFFECT A or EFFECT B controls.

18 Use the *ENTER* button to confirm your program selection.

☞ **When the MIDI functions are inactive, one effect can be stored for each of the two channels on your ULTRATWIN, which allows for instance, to select a DELAY effect for the OVERDRIVE channel and assign a REVERB/CHORUS effect to the CLEAN channel. The corresponding program**

numbers will be stored with the channels and can be recalled using the footswitch or the front panel buttons. When MIDI is on, this assignment feature will be disabled, so that in this mode both channels and effects can be selected separately.

19 The *DOWN* button allows you to decrement the program number.

20 With the *UP* button you can increment the program number of the built-in effects module. Keep the button pressed to scroll through the programs.

☞ **When you start editing a preset, the decimal point in the 2-digit display starts flashing. Press the ENTER button for a while to overwrite the factory preset and save your own effect setting. To restore the factory presets, simply press and keep the ENTER button while you switch on your ULTRATWIN.**

21 The *EFFECT A* control determines the ratio of original and effect signals. Depending on the preset selected, you can either control the ratio of original and **left-channel** effect signals, or of original and **first-effect** signals (combination effects). Some effects use this control to edit a second, effect-specific parameter.

22 Use the *EFFECTS* button to activate/deactivate the selected effect.

23 The *EFFECT B* control determines the mix of original and effect signals. Depending on the preset selected, you can either control the ratio of original to **right-channel** effect signals, or of original to **secondary-effect** signals (combination effects). Some effects use this control to edit a third, effect-specific parameter.

24 The *AUX IN* control in the Master section determines the volume of the AUX signal fed in via the AUX IN jacks on the rear of the ULTRATWIN (e.g. drum computer, playback).

25 The *POWER* LED lights up when you switch on your ULTRATWIN.

26 The *MASTER* control in the Master section determines the overall volume level of your ULTRATWIN.

27 Use the *POWER* switch to put the ULTRATWIN into operation.

1.3.2 Rear panel

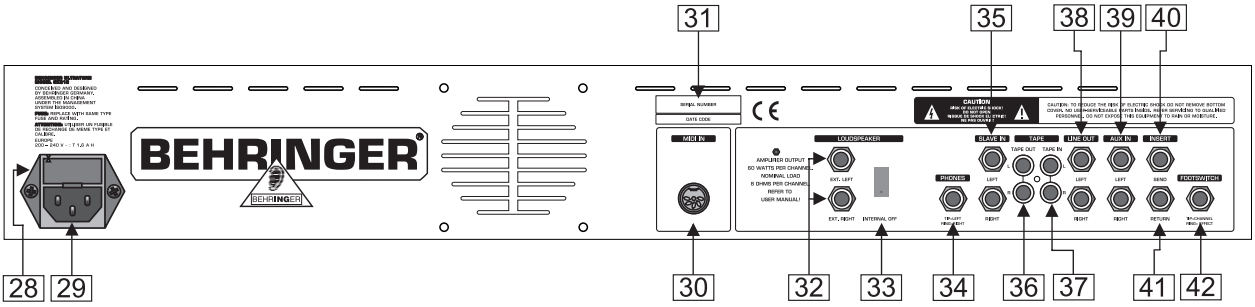

Fig. 1.3: The rear panel connectors

28 *FUSE HOLDER/VOLTAGE SELECTOR*. Please make sure that the voltage indicated on the unit matches your local voltage, before you attempt to connect and operate the ULTRATWIN GX212. Blown fuses may only be replaced by fuses of the same type and rating. Some models allow for inserting the fuse holder in two different positions, in order to switch over from 230 V to 115 V operation, and vice versa. Please note that for 115 V operation outside Europe, you need to use a fuse of a higher rating (see chapter 5 “INSTALLATION”).

29 Use the enclosed power cord to connect the unit to the mains.

30 *MIDI IN*. This connector gives you MIDI remote control over your ULTRATWIN. You can change parameters using controller information, switch over effect programs, change channels and bypass the effects module by means of program change instructions.

31 *SERIAL NUMBER*. 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.

32 The connectors *EXT. LEFT* and *EXT. RIGHT* allow for connecting external loudspeakers. Please always connect speakers with a minimum resistance of 4 Ω. Maximum power will be delivered if 8 Ω speakers are connected. Push down the INTERNAL OFF button (see 33) to operate external speakers.

33 Use the *INTERNAL OFF* switch to mute the internal speakers of your ULTRATWIN, in particular, when monitoring the amp with a pair of headphones. When external speakers are connected, you need to push down this switch to re-route the audio signal. You can also use the SPK OFF switch to mute the speakers during a concert.

34 The 1/4" stereo jack allows you to monitor the ULTRATWIN's audio signal with a pair of commercially available headphones.

☞ **Since speakers can have quite an impact on the sound of a guitar amp, both the headphones and LINE OUT/TAPE OUT signals are frequency-corrected (Speaker Emulation). Without this frequency correction, extreme treble frequencies would deteriorate the sound. You can still tap the unprocessed signal directly after the pre-amp (INSERT SEND jack), without interrupting the signal path in the amplifier (INSERT RETURN jack may not be used in this case). Starting with a certain volume level, low-impedance headphones may begin to produce distortion. In such a case, please reduce the volume by turning down the VOLUME controls.**

35 Using the *SLAVE IN* jacks you can feed in an external signal to be routed to the ULTRATWIN's power stage. In this case, the connection between preamp and power stage will be disabled. These jacks are designed to drive a master guitar amp from the ULTRATWIN's power stage. Of course, you could also insert a guitar preamp.

☞ **Since the SLAVE IN jacks are configured as insert jacks, you can also insert an external stereo effects device. Use a dedicated insert cable which has a 1/4" stereo plug on the one end, and two mono plugs on the other. Connect the tip contact (return) with the output, and the ring contact (send) with the input of the effects device (see chapter 2.3).**

36 The *TAPE OUT* jack provides the same signal as the LINE OUT jacks, however, has RCA jacks for direct connection to a tape deck or HiFi system.

37 The *TAPE IN* jacks are the same as the AUX IN, however, have RCA jacks for direct connection to a tape deck or a HiFi system.

38 The *LINE OUT* provides the ULTRATWIN's audio signal in stereo, for example, to send it to a recording machine. This output is frequency-corrected (Speaker Emulation).

39 The *AUX IN* allows you to feed in additional stereo signals, for example, to play with a drum computer or some sort of playback. Additionally, you can use the AUX IN in combination with the INSERT SEND as a parallel effect path: connect the INSERT SEND to the input and the AUX IN to the output of the effects device (INSERT RETURN jack should not be used in this case!). Thus, the signal path in the amplifier will not be interrupted and you can add the effect portion from the external device, using the AUX control described in point 24. Please note that the external effects device must be set to 100 % wet for this purpose.

40 The ULTRATWIN also features a serial insert path for external effects such as a wah-wah pedal. This is the *INSERT SEND* jack you need to connect to the input of the effects device.

41 This is the *INSERT RETURN* jack that can be connected to the output of an external effects device.

☞ **Please note that when using the serial effects path, the external effect should not be set to 100 % wet (100 % effect signal); otherwise, there will be no direct signal portion fed back to the ULTRATWIN.**

42 Connect the enclosed footswitch FS112 via its stereo plug to the *FOOTSWITCH* jack. The footswitch allows you to change channels or disable the effects module.

2. WIRING EXAMPLES

2.1 Standard setup consisting of guitar, footswitch and external effects device

To use your ULTRATWIN for rehearsals or on stage, please wire up the unit as shown in fig. 2.1. Of course, you can also use a wah-wah or other pedal effect instead of the external 19" effects unit, or simply work with the internal effects without having to use the insert path at all. Connecting the headphones will mute the built-in speaker.

When you wish to use a guitar tuner, please connect it to the INSERT SEND of your ULTRATWIN. If there is no further effects device connected, you can leave the INSERT RETURN as it is. However, to use an external effects device, place the tuner before the effects in the signal chain, so that it works on unprocessed signals only.

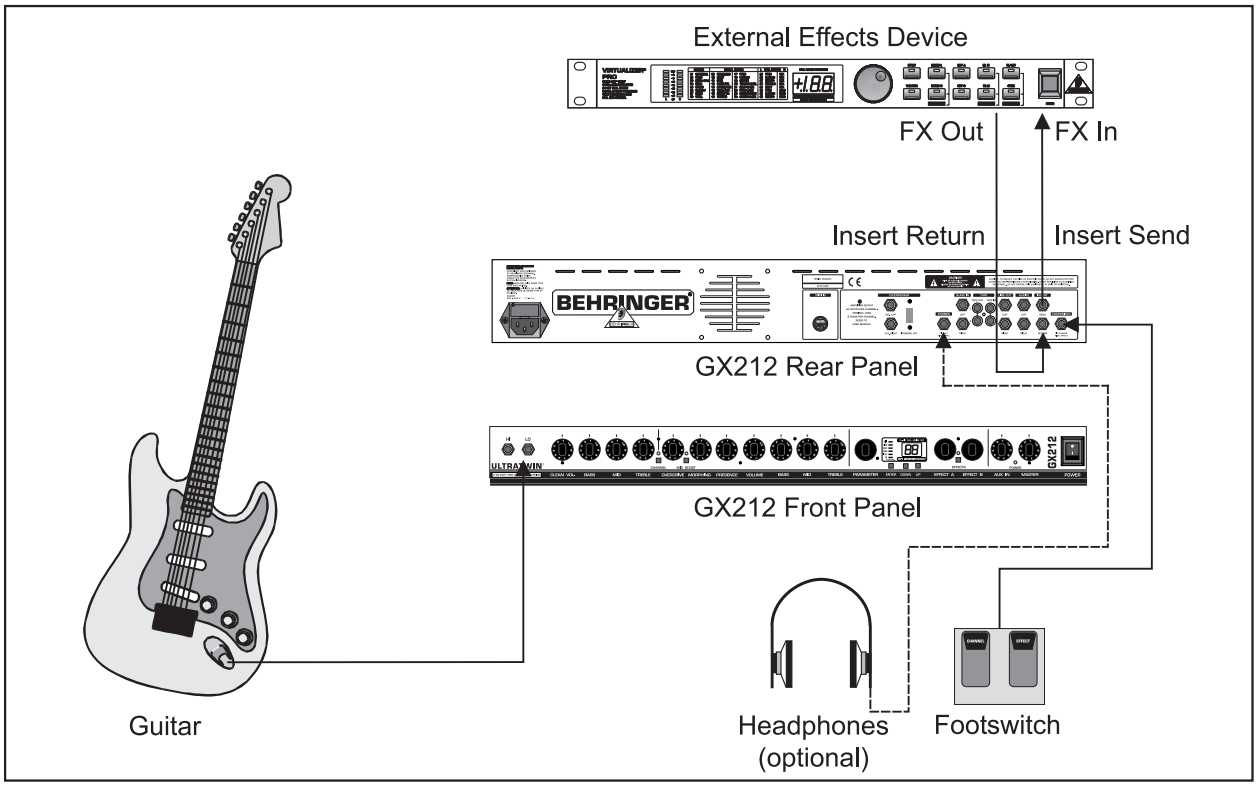

Fig. 2.1: Standard setup

2.2 Expanded setup with MIDI foot controller, playback source and mixing console

To use your ULTRATWIN for advanced applications, please consider the following suggestions. Of course, the expanded configuration suggested in fig. 2.2. builds on the standard setup described in chapter 2.1.

Use the MIDI foot controller to change presets and/or channels, set volume and wah, etc. The line out signal can be fed into a P.A. or recording console, and the AUX input can be used to play back e.g. cassette recorder signals through the GX212.

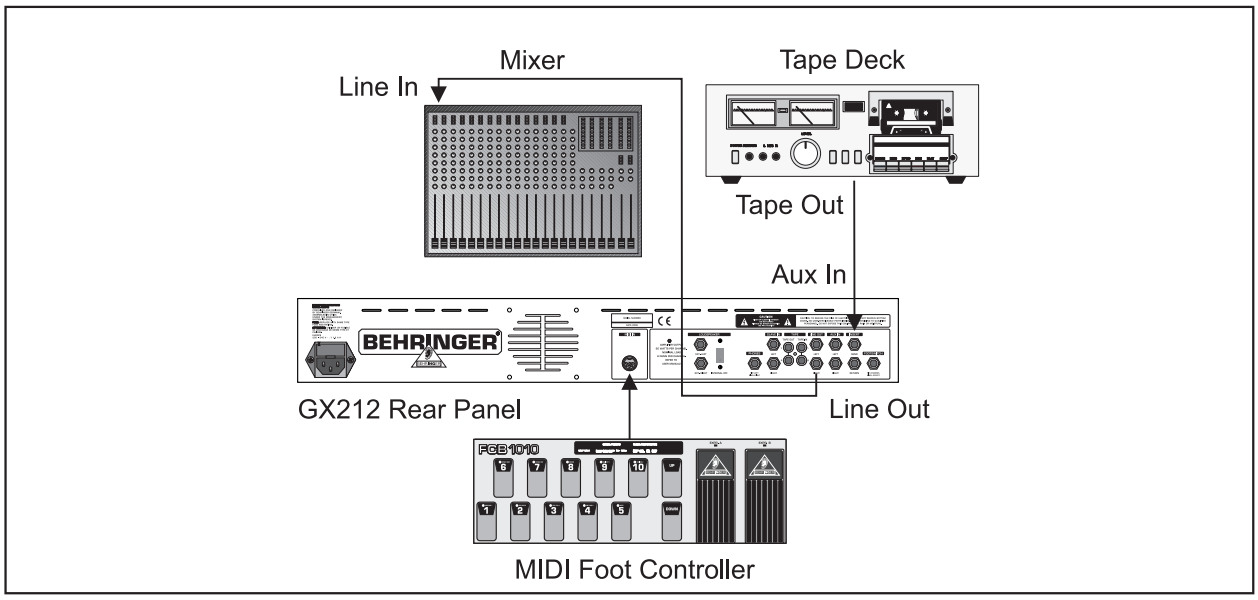

Fig. 2.2: Expanded setup

2.3 Master/slave setup

2.3.1 The ULTRATWIN GX212 as master

The SLAVE IN jacks can also be used to amplify the ULTRATWIN's signal with an additional power amp. Use two conventional instrument cables (one conductor plus shielding) having a mono 1/4" plug on the one end, and a stereo 1/4" plug on the other. On the stereo plug, tip and ring should be bridged. To route the ULTRATWIN's audio signal to the external power amp, connect the stereo plug to the SLAVE IN jacks and the mono plug to the power amp input jacks.

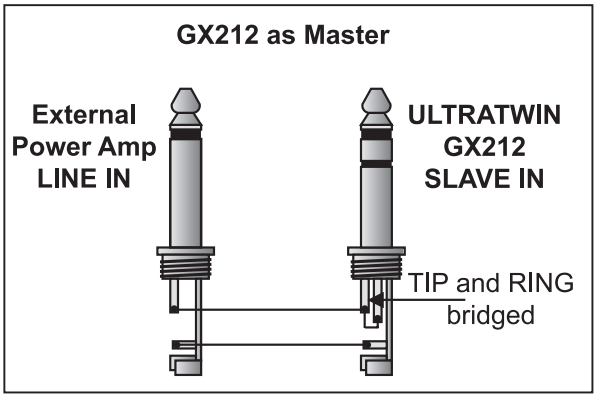

Fig. 2.3: The ULTRATWIN GX212 as master

2.3.2 The ULTRATWIN GX212 as slave, driven by an external amp/preamp

To operate the stereo power stage of your ULTRATWIN from an external amplifier/preamp, connect the line outputs of the external amp to the SLAVE IN jacks on the GX212. Use conventional instrument cables with mono 1/4" plug. If you use a mono preamp, its signal should be split up among the two SLAVE IN inputs of your ULTRATWIN, using a commercial Y cable.

3. EFFECTS PROCESSOR

A very special feature of your ULTRATWIN is its built-in effects processor, which offers the same audio quality and algorithms as our popular 19" effects devices VIRTUALIZER PRO and MODULIZER PRO. This effects module provides 31 different groups of first-class effects such as reverb, chorus, flanger, delay, pitch shifter, compressor, expander, wah-wah variations, various combination effects and even tube and speaker emulation. The latter, in particular, can make a guitarist's life much easier in home recording studios, because they allow you to record the amp's signal without having to use a microphone. A total of 99 presets gives you a broad range of versatile effects, which can be edited in three parameters each. Additionally, the multi-effects processor provides different effects variations, which are permanently linked to the presets. All presets can be overwritten with your own settings. To restore the factory default settings, simply keep the ENTER button pressed while you power up the ULTRATWIN.

The two buttons UP and DOWN allow you to select a preset. To activate the selected preset, simply press the ENTER button. The display reads the number of the currently active preset (the list on the effect module shows the various effect groups available). As soon as you edit a preset with the PARAMETER, EFFECT A and EFFECT B controls, the display will read the respective parameter values. After about three seconds or when you press ENTER, UP or DOWN, the display will switch back to the program number. Whenever a parameter has been changed, the decimal point in the 2-digit display starts flashing. To save your edits and overwrite the existing preset, simply press the ENTER button for about two seconds. The EFFECT A and EFFECT B controls determine (with a few exceptions) the mix of original and effect signals. EFFECT A controls the left channel and/or the first effect (if combination effects are used), and EFFECT B adjusts the right channel and/or the second effect. As a rule of thumb, values between 20 % (moderate effect) and 40 % (clearly audible effect) should deliver good results. In the case of reverb and delay presets, the mix ratio is adjustable from 0 % through 50 % in steps of 1 %.

3.1 Description of effects

01-02 Spring Reverb: Even a guitar amp with a digital multi-effects processor should allow you to use a spring reverb. This algorithm emulates the typical sound of a spring reverb, as it is known from numerous guitar amps. However, here you don't have the typical shatter sound when your amp gets knocked over.

03-04 Studio: This effect simulates the characteristics of middle-sized rooms. With its natural sound it can be used for a great variety of applications.

05-06 Chamber: You can clearly hear the sound as it bounces back from the walls of this "room". The program is particularly suited for diffuse types of reverb or to make a dry guitar sound more natural.

07-08 Stage: A fine reverb e.g. to liven up and widen a clean guitar.

09-10 Concert: Here, you can choose from a small theater (preset 9, short pre-delay) or a large concert hall (preset 10, long pre-delay). Compared to the STUDIO reverb program, these algorithms sound more lively and have more treble frequencies.

11-12 Plate: The sound of an ancient plate reverb. A classic algorithm that makes your guitar sound wonderful and enchanting.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
1	SPRING REVERB	short Pre-Delay	Reverb Time	Mix L	Mix R
2		long Pre-Delay	Reverb Time	Mix L	Mix R
3	STUDIO	short Pre-Delay	Reverb Time	Mix L	Mix R
4		long Pre-Delay	Reverb Time	Mix L	Mix R
5	CHAMBER	short Pre-Delay	Reverb Time	Mix L	Mix R
6		long Pre-Delay	Reverb Time	Mix L	Mix R
7	STAGE	short Pre-Delay	Reverb Time	Mix L	Mix R
8		long Pre-Delay	Reverb Time	Mix L	Mix R
9	CONCERT	short Pre-Delay	Reverb Time	Mix L	Mix R
10		long Pre-Delay	Reverb Time	Mix L	Mix R
11	PLATE	short Pre-Delay	Reverb Time	Mix L	Mix R
12		long Pre-Delay	Reverb Time	Mix L	Mix R

Tab. 3.1: Parameters of effects 01 through 12

Reverb algorithms 01 through 12 provide two variations each. Basically, the first variation uses a short pre-delay (delay until the actual reverb can be heard), while the second variation works with long pre-delays. In general, you can adjust the reverb time with the PARAMETER control, while the two EFFECT controls adjust the mix of original and effect signals in the left/right channel.

13-14 Gated Reverb: This reverb is cut off abruptly and became famous through Phil Collins' "In the air tonight". Use the EFFECT A control to adjust the threshold above which the reverb is triggered (Sensitivity). The higher this value, the less reverb you will hear. EFFECT B governs the mix of original and reverb signals. The PARAMETER control adjusts the reverb and gate times.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
13	GATED REVERB	min. Density	Gate/Reverb Time	Sensitivity	Mix
14		max. Density	Gate/Reverb Time	Sensitivity	Mix

Tab. 3.2: Parameters of effects 13 and 14

15-16 Ambience: The reverb of any room consists of so-called "early reflections" and the reverb "tail". This algorithm emulates the first 15 of these early reflections. Since our ears use these reflections to determine the room size, they can be employed to create subtle and impressive reverb densities, without clouding the overall signal with long reverb tails. The PARAMETER control modifies the room size, while EFFECT A adjusts the pre-delay time, and EFFECT B governs the mix of original and effect signals. This effect is particularly impressive when played through a pair of headphones.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
15	AMBIENCE	min. Reflections	Room Size	Pre-Delay	Mix
16		max. Reflections	Room Size	Pre-Delay	Mix

Tab. 3.3: Parameters of effects 15 and 16

17-19 Wah/Delay/Distortion: In general, filters are used to provide some static equalization of a signal's frequency response. The wah effect – combined with delay and distortion in this preset – allows the mid-range frequencies to pass, while it more or less suppresses the remaining frequency ranges. Guitarists such as Jimi Hendrix and Eric Clapton made this effect popular, and it still hasn't gone out of fashion. Use the PARAMETER control to adjust the delay time. EFFECT A allows you to determine the distortion intensity, which also depends on the volume settings chosen in the CLEAN and OVERDRIVE channels. With EFFECT B you can edit the delay mix. Using MIDI controller #15 you can edit the operating range of the wah effect, e.g. via a MIDI foot controller. In this way, it is possible to use the wah effect like an analog wah foot pedal.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
17	WAH / DELAY / DISTORTION	Feedback 0 %	Delay Time	Drive	Delay Mix
18		Feedback 10 %	Delay Time	Drive	Delay Mix
19		Feedback 30 %	Delay Time	Drive	Delay Mix

Tab. 3.4: Parameters of effects 17 through 19

20 Delay/Reverb: This effect produces a normal delay with adjustable delay time that passes a reverb whose mix ratio can be edited.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
20	DELAY / REVERB	-	Delay Time	Delay Mix	Reverb Mix

Tab. 3.5: Parameters of effect 20

21-29 Delay: This algorithm delays the input signal and generates several repeats. The first five presets (21 through 24) produce a stereo delay, with the PARAMETER control setting the delay time for the right channel. The left channel's delay time is 2/3 as long as that on the right side. As usual, EFFECT A and EFFECT B determine the mix of original and effect signals. Delay presets 25 through 29 offer long mono delay, which can be adjusted in their delay time (PARAMETER control), delay feedback (repeats, EFFECT A) and delay mix parameters (EFFECT B).

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
21	DELAY (stereo)	min. Feedback ↓ max. Feedback	Delay Time R	Mix L	Mix R
22			Delay Time R	Mix L	Mix R
23			Delay Time R	Mix L	Mix R
24			Delay Time R	Mix L	Mix R
25	DELAY (long mono)	-	Delay Time	Feedback	Mix
26		-	Delay Time	Feedback	Mix
27		-	Delay Time	Feedback	Mix
28		-	Delay Time	Feedback	Mix
29		-	Delay Time	Feedback	Mix

Tab. 3.6: Parameters of effects 21 through 29

The LFO speed of all modulation effects is controlled by the PARAMETER control. EFFECT A controls the effect intensity or depth. High values produce a very intensive effect. In the case of the tremolo algorithm, EFFECT A adjusts the panning between left and right, and vice versa.

30-33 Phaser: From a technical point of view, phasing is a modulation effect producing a multi-stage phase shift between direct and effect signals. As the frequency-dependent phase shift is controlled by an LFO (low-frequency oscillator), the various frequency ranges of the signal are raised or lowered in their amplitudes. Depending on the setting you choose, the resulting phasing effect is either slightly modulating in character or produces heavy sound coloration reminiscent of a continuously modulated filter.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
30	PHASER	Feedback 0 %	LFO Speed	Depth	Mix
31		Feedback 62 %	LFO Speed	Depth	Mix
32		Feedback 62 %	LFO Speed	Depth	Mix
33		Feedback 77 %	LFO Speed	Depth	Mix

Tab. 3.7: Parameters of effects 30 through 33

34-37 Chorus: Imagine a string quartet, with each musician playing the same notes. As a matter of fact though, no musician is able to play with an intonation accuracy of 100%. Consequently, slightly detuned signal portions are produced which overlap in the time domain. To emulate this effect, chorusing uses copies of the original signal, which are then delayed by 20 to 40 msec, detuned slightly and modulated by the LFO. The result is a detune effect that is very pleasant in character. As this effect is used so frequently and in such a variety of signal-widening applications, any recommendation given here would mean a restriction of its uses.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
34	CHORUS	fat	LFO Speed	Depth	Mix
35		slow	LFO Speed	Depth	Mix
36		stereo	LFO Speed	Depth	Mix
37		stereo	LFO Speed	Depth	Mix

Tab. 3.8: Parameters of effects 34 through 37

38-42 Chorus/Reverb: Here, the signal passes a chorus effect with various intensities and then a reverb that can be edited in time.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
38	CHORUS / REVERB	ultra	Reverb Time	Chorus Mix	Reverb Mix
39		slow	Reverb Time	Chorus Mix	Reverb Mix
40		medium I	Reverb Time	Chorus Mix	Reverb Mix
41		medium II	Reverb Time	Chorus Mix	Reverb Mix
42		fast	Reverb Time	Chorus Mix	Reverb Mix

Tab. 3.9: Parameters of effects 38 through 42

43-47 Chorus/Delay: First, the signal is chorused with various intensities, then follows a delay effect with various feedback levels and adjustable delay time.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
43	CHORUS / DELAY	ultra	Delay Time	Chorus Mix	Delay Mix
44		slow	Delay Time	Chorus Mix	Delay Mix
45		medium I	Delay Time	Chorus Mix	Delay Mix
46		medium II	Delay Time	Chorus Mix	Delay Mix
47		hold	Delay Time	Chorus Mix	Delay Mix

Tab. 3.10: Parameters of effects 43 through 47

48-51 Flanger: An LFO constantly modulates the pitch of the effect signal up and down by a few cents and then sends the effect signal back to the input. This effect can be excellently combined with distorted guitar sounds.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
48	FLANGER	fat	LFO Speed	Depth	Mix
49		classic	LFO Speed	Depth	Mix
50		stereo	LFO Speed	Depth	Mix
51		stereo	LFO Speed	Depth	Mix

Tab. 3.11: Parameters of effects 48 through 51

52-56 Flanger/Reverb: Here, a flanger with various intensities is followed by a reverb with adjustable reverb time.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
52	FLANGER / REVERB	ultra	Reverb Time	Flanger Mix	Reverb Mix
53		slow	Reverb Time	Flanger Mix	Reverb Mix
54		medium I	Reverb Time	Flanger Mix	Reverb Mix
55		medium II	Reverb Time	Flanger Mix	Reverb Mix
56		fast	Reverb Time	Flanger Mix	Reverb Mix

Tab. 3.12: Parameters of effects 52 through 56

57-61 Flanger/Delay: The first element is a flanger with various intensity levels, then comes a delay effect with adjustable delay time.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
57	FLANGER / DELAY	ultra	Delay Time	Flanger Mix	Delay Mix
58		slow	Delay Time	Flanger Mix	Delay Mix
59		medium I	Delay Time	Flanger Mix	Delay Mix
60		medium II	Delay Time	Flanger Mix	Delay Mix
61		fast	Delay Time	Flanger Mix	Delay Mix

Tab. 3.13: Parameters of effects 57 through 61

62-63 Stereo Tremolo: Tremolo is a more or less fast, intensive variation of the signal amplitude, and is complemented here by a panorama effect.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
62	STEREO TREMOLO	-	LFO Speed	Pan	Mix
63		-	LFO Speed	Pan	Mix

Tab. 3.14: Parameters of effects 62 and 63

64-66 Tremolo/Delay: A more or less fast, intensive amplitude modulation complemented by a delay effect. The variations provide for various modulation speeds. The delay time can be set with the PARAMETER control.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
64	TREMOLO / DELAY	ultra	Delay Time	Tremolo Mix	Delay Mix
65		slow	Delay Time	Tremolo Mix	Delay Mix
66		medium	Delay Time	Tremolo Mix	Delay Mix

Tab. 3.15: Parameters of effects 64 through 66

67-68 Rotary Speaker: This is the quintessential simulation of the classical organ effect normally produced by speakers that rotate at slow/fast speed in a bulky and extremely heavy speaker cabinet. This effect uses the physical principle known as Doppler effect. The PARAMETER control determines the speed of horn (treble) and rotor (bass), while EFFECT A allows you to modify the basic character of the sound. Finally, EFFECT B lets you edit the mix ratio.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
67	ROTARY SPEAKER	-	Speed	Variation	Mix
68		-	Speed	Variation	Mix

Tab. 3.16: Parameters of effects 67 and 68

69-70 Magic Drive: This is an absolutely up-to-date effect combined with a delay. EFFECT A governs the basic character of the effect in 32 steps, PARAMETER adjusts the delay time, and EFFECT B controls the delay mix. As a little extra, this effect includes an LFO-controlled notch filter, which is added as of Variation #24.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
69	MAGIC DRIVE	-	Delay Time	Variation	Delay Mix
70		-	Delay Time	Variation	Delay Mix

Tab. 3.17: Parameters of effects 69 and 70

71-72 Auto Wah: Auto Wah is a velocity-sensitive effect that allows low frequencies to pass, while high frequencies are more or less suppressed. PARAMETER controls the effect sensitivity, and EFFECT A sets the cutoff frequency, which can be shifted upwards by raising this value.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
71	AUTO WAH	fast	Sensitivity	Depth	Mix
72		slow	Sensitivity	Depth	Mix

Tab. 3.18: Parameters of effects 71 and 72

73-74 LFO Wah: In the LFO Wah effect the LFO governs the speed of frequency modulation. Here, you can produce wah-wah effects that are repeated at regular intervals. Use the PARAMETER control to set the LFO speed, while EFFECT A determines the threshold frequency. The LFO Wah delivers astounding results.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
73	LFO WAH	LFO Band Pass	LFO Speed	Depth	Mix
74		LFO Band Pass	LFO Speed	Depth	Mix

Tab. 3.19: Parameters of effects 73 and 74

75-81 Pitch Shifter: This effect shifts the pitch of the input signal and can be used to produce musical intervals and harmonies or simply to widen a single voice. Heavy detuning by several semi-tones up creates a Mickey-Mouse-type effect. The preset variations include various fixed intervals for the right channel, while the left channel can be shifted with the PARAMETER control. Depending on your mix settings, you can thus hear a triad for each tone of the input signal. Effects #80 and #81 are used to "widen" the signal and feature a detune option in the left channel (+/-25 cents).

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
75	PITCH SHIFTER	-12	Tune Left	Mix L	Mix R
76		-5	Tune Left	Mix L	Mix R
77		+3	Tune Left	Mix L	Mix R
78		+4	Tune Left	Mix L	Mix R
79		+7	Tune Left	Mix L	Mix R
80		+4 %	Tune Left	Mix L	Mix R
81		+8 %	Tune Left	Mix L	Mix R

Tab. 3.20: Parameters of effects 75 through 81

82-85 Pitch/Reverb: Here, a pitch shifter set to various cent and semi-tone intervals is followed by a stereo reverb whose time can be set with the PARAMETER control.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
82	PITCH SHIFTER / REVERB	-12	Reverb Time	Pitch Mix	Reverb Mix
83		+3	Reverb Time	Pitch Mix	Reverb Mix
84		+4 %	Reverb Time	Pitch Mix	Reverb Mix
85		+8 %	Reverb Time	Pitch Mix	Reverb Mix

Tab. 3.21: Parameters of effects 82 through 85

86-89 Pitch/Delay: First, the signal passes the pitch shifter set to various intervals. Then, a delay effect whose time can be edited with the PARAMETER control is added. The two EFFECT controls adjust the mix of both effects.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
86	PITCH SHIFTER / DELAY	-12	Delay Time	Pitch Mix	Delay Mix
87		-5	Delay Time	Pitch Mix	Delay Mix
88		+4	Delay Time	Pitch Mix	Delay Mix
89		+7	Delay Time	Pitch Mix	Delay Mix

Tab. 3.22: Parameters of effects 86 through 89

90-91 Compressor: Often, the signal level exceeds the headroom of signal-processing devices and therefore needs to be limited in its dynamic range, so as to avoid distortion. This job is done by compressors and/or limiters. Limiters abruptly limit the signal above a specific threshold, while compressors provide for a “soft” control process over a wider range. With the PARAMETER control you can set the compressor threshold. EFFECT A determines the compression ratio. EFFECT B allows you to raise the volume to adapt the compressed signal to the unprocessed one. To achieve optimum adaptation do as follows: adjust the threshold and ratio as required, then compare the signal levels by switching the effect repeatedly on and off. Adapt the levels with EFFECT B, so that there will be no audible level difference between compressed and uncompressed signals. Use this effect to give your guitar longer sustain, or to make the attack sounds of funky guitar licks (Chicken Scratch) clearly audible, even though the guitar signal is actually limited in level.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
90	COMPRESSOR	fast	Sensitivity	Ratio	Gain
91		slow	Sensitivity	Ratio	Gain

Tab. 3.23: Parameters of effects 90 and 91

92-93 Expander: All sorts of background noise and hum limit the dynamic range of the wanted signal. As long as the level of the wanted signal is considerably above the noise floor, background noise is inaudible: the interference signal is masked by the music. Expanders can be used to efficiently expand the dynamic range of signals. Small signal amplitudes are cut additionally, which at the same time reduces background noise. Use the PARAMETER control to determine the expander threshold. EFFECT A adjusts the expansion ratio, while EFFECT B drives a matching amplifier (much like in the compressor effect) to adapt the level of the processed signal.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
92	EXPANDER	Overdrive	Sensitivity	Ratio	Gain
93		Clean	Sensitivity	Ratio	Gain

Tab. 3.24: Parameters of effects 92 and 93

94-96 Guitar Combo: This effect simulates the sound characteristics of a complete guitar amp, mimicking not only two tube stages, but also cabinet and speaker. The PARAMETER control determines the distortion intensity, while EFFECT A adjusts the presence of the sound as the signal’s high-frequency portions increase. EFFECT B controls the mix ratio.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
94	GUITAR COMBO	-	Drive	Presence	Mix
95		-	Drive	Presence	Mix
96		-	Drive	Presence	Mix

Tab. 3.25: Parameters of effects 94 through 96

97-99 Speaker Cabinet: This algorithm emulates three different types of speaker cabinets. Additionally, you can shift the speaker's main resonance peak. Various degrees of resonance emphasis allow you to emulate different speaker characteristics. The PARAMETER control adjusts the cutoff frequency of the low-pass filter. EFFECT A determines the gain of the resonance filter. EFFECT B can be used to adjust the filter frequency.

Preset-Nr.	Effect	Variation	PARAMETER	EFFECT A	EFFECT B
97	SPEAKER CABINET	Stack A	HF Cut	Peak Gain	Peak Frequency
98		Stack B	HF Cut	Peak Gain	Peak Frequency
99		Combo	HF Cut	Peak Gain	Peak Frequency

Tab. 3.26: Parameters of effects 97 through 99

3.2 Controlling the ULTRATWIN via MIDI

With its built-in MIDI interface you can integrate your ULTRATWIN into any MIDI setup. The GX212 is capable of receiving both program change and MIDI controller information. So, you can change programs via MIDI using a MIDI foot controller or a computer-based sequencer software. Our MIDI foot controller FCB1010 gives you precisely these and more options, and is a perfect match for all BEHRINGER guitar amps. For example, you could wire the ULTRATWIN as follows:

Connect the MIDI IN jack of your ULTRATWIN to the MIDI OUT jack of a MIDI foot controller (see fig. 2.2). Now, enable the MIDI functions on your ULTRATWIN by pressing both UP and DOWN (multi-effects processor) for about two seconds. Select a MIDI channel (1 through 16, "ON" = Omni mode, "OF" = off and 1 through 16, or "On" (Omni) plus decimal point = Store Enable mode, see chapter 3.2.1). Confirm your selection with ENTER. Omni mode means that your ULTRATWIN receives and processes MIDI information on all channels. Of course, you should select the same channel both on your MIDI foot controller and ULTRATWIN (see MIDI foot controller user's manual).

☞ **Once you activate the MIDI functions, the automatic effect-to-channel assignment feature will be disabled, i.e. changing channels does not automatically load the previously set effect. As this assignment feature would cause some confusion when controlling the ULTRATWIN via a MIDI foot controller, it makes sense only when it is controlled from the enclosed footswitch or directly from the ULTRATWIN's front panel. To operate the ULTRATWIN without MIDI remote control, please disable the MIDI functions (display reads OF).**

You can select presets via MIDI using program change instructions. Since the range of program change numbers is 0 through 127, program change instruction 0 corresponds to preset 1, #1 to preset 2, and so forth (see table 6.2 in the appendix). After changeover the preset is activated immediately, i.e. it will not be affected by previously adjusted bypass settings.

The three adjustable parameters PARAMETER, EFFECT A and EFFECT B can be controlled in real time from a MIDI foot controller. First, select a controller number for the foot pedal on your MIDI foot controller (controller numbers 12 (PARAMETER), 13 (EFFECT A) and 14 (EFFECT B)). Then, use the foot pedal on your MIDI foot controller to adjust the values for the three parameters.

Channel changes can be effected with controller #10. Sending value 0 via this controller will activate the CLEAN channel, while value 1 activates the OVERDRIVE channel. Program change instructions can also be used to change channels. Program change #123 activates the CLEAN channel, program change #124 selects the OVERDRIVE channel of your ULTRATWIN. In addition to changing channels, you can also disable effects, by sending the value 0 via controller #11. Value 1 enables the effect. Alternatively, you can bypass the effect section by sending program change instruction #127.

MIDI controller #7 adjusts the input sensitivity of the effects module, enabling you to set the overall volume of your ULTRATWIN as desired. Since this controller has no influence on the Master Volume control, you should adjust the maximum volume before with the Master Volume control, then use MIDI controller #7 to reduce the volume. This function is also known as "Volume Controller".

The operating range of the wah effect can be determined with MIDI controller #15.

Additionally, you can deactivate the LFO in LFO-controlled modulation effects, and modulate these effects with MIDI controller #15. To activate this MIDI controller, you need to set the LFO speed to zero, either on the ULTRATWIN or by means of the corresponding MIDI controller.

Of course, you can also control the ULTRATWIN from a computer-based sequencer software, particularly in a home recording environment. Specific environments for popular MIDI sequencer programs will soon be available from our web site (www.behringer.com).

3.2.1 Store Enable mode

Store Enable mode allows you to store parameter changes directly, e.g. from a MIDI sequencer. Activate this mode by pressing both UP and DOWN on the multi-effects processor for about 2 seconds, then use the same keys to select a channel for MIDI reception (1 through 16, or ON (Omni) with decimal point). Confirm your selection with ENTER. Now, if you use MIDI controller #18 to send data from your MIDI sequencer on the adjusted MIDI channel, any parameter changes made to the currently active preset will be stored. Sending MIDI controller #18 data while Store Enable mode is on has the same effect as a long key press on the effect module's ENTER key.

4. HISTORICAL BACKGROUND by Neville Marten (Guitarist Magazine)

The guitar amp: your tone generator

Many guitar players think of their amplifier as the least important link in their musical chain. Sure, everyone needs the right guitar, with the right finish, pickups and tremolo; and of course effects these days are so important in looking and sounding cool.

But what of the humble guitar amp? Is it just an ugly box that stands behind you, a heavy hindrance that's just a drag to get into and out of the car? No, it's your powerhouse, a tone generator that should work as an equal member with you, your guitar and effects in the creation of the best possible sound.

Ever since the 1940s, when a radio repairman in Orange County California started customising tube radio circuits for the new breed of electric guitarists, guitar amps have been evolving into what we see today. Great American names like Fender™, Ampeg™ and Gibson™ supplied small-output amplifiers to the guitarists of the '40s and '50s, creating the sound of electric jazz, rock'n'roll and country music; a sound that's still as fresh as ever at the dawn of this new millennium.

As the '50s became the '60s, the British sound was born with Vox™ producing small-powered valve amps for groups like The Shadows, then later The Beatles and The Rolling Stones, The Hollies and The Hermits. Then, in the mid-'60s a drummer from London was asked by some budding musicians to build them some amplification. Jim Marshall™ took the basic American design and using British components and speakers, created higher Wattage amps and multi-speaker cabinets to give bands like The Who, Cream and The Jimi Hendrix Experience the power to begin their assaults on the rock stadiums of the world.

Amp design has come a long way since then. Multi-channels and cascading gain stages, as pioneered by Randall Smith and his Mesa Boogie™ amps, are found in the majority of stacks and combos built by amp manufacturers all over the world today. Modern, solid-state circuits and digital effects are now commonplace and in some instances work successfully on their own, or hand-in-hand with classic tube designs, to create versatile performing instruments for working guitarists. Other manufacturers are looking back to the old ways, with hand-wired, vintage-style "boutique" amps than can cost the earth.

Whichever option you choose, the ears of discerning musicians recognise that, behind the bells, whistles and hype, there must be a great-sounding amplifier – a real musical tool that not only uses the best of today's technologies, but pays its respects to the great pioneers that have gone before.

(We would like to thank Mr. Neville Marten, the editor of Guitarist Magazine, for this little essay about the history of guitar amp development.)

5. INSTALLATION

Your BEHRINGER ULTRATWIN was carefully packed in the factory and the packaging is 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 during transit.

☞ **If the unit is damaged, please do not return it to BEHRINGER, 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.**

5.1 Mains connection

Please ensure that the ULTRATWIN is set to the correct supply voltage before connecting the unit to the AC power system! Three triangular markings can be found on the fuse holder at the AC power connection socket. Two of these three triangles will be aligned with one another. The ULTRATWIN is set to the operating voltage shown next to these markings and can be switched over by twisting the fuse holder by 180°. **IMPORTANT: This does not apply to export models designed only for 115 V ~!**

The mains connection of the ULTRATWIN is made by using the enclosed mains cable and a standard IEC receptacle. It meets all of the international safety certification requirements.

☞ **Please make sure that all units have a proper ground connection. For your own safety, never remove or disable the ground conductor of the unit or of the AC power cable.**

5.2 Audio connections

The BEHRINGER ULTRATWIN is installed with unbalanced 1/4" jacks. Only the headphones output is available via a stereo 1/4" jack.

☞ **Please ensure that only qualified persons install and operate the ULTRATWIN. During installation and operation the user must have sufficient electrical contact to earth. Electrostatic charges might affect the operation of the ULTRATWIN!**

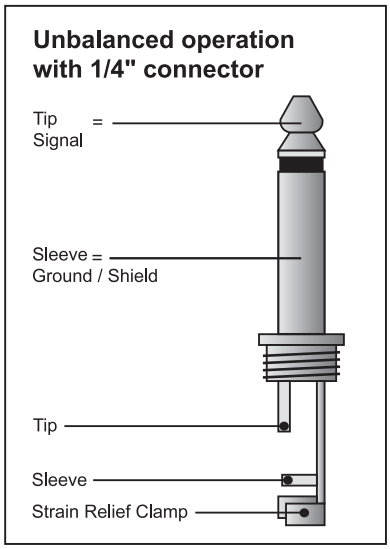

Fig. 5.1: Wiring of a mono 1/4" plug

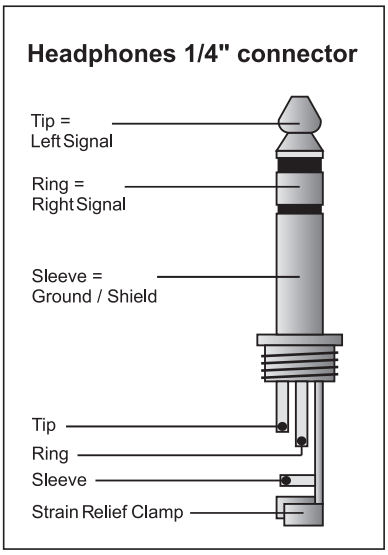

Fig. 5.2: Wiring of a stereo headphones 1/4" plug

5.2.1 Loudspeaker connection

Your GX212 features two speaker jacks that allow you to hook up supplementary speakers. Optimum adaptation is ensured with 8 Ω loudspeakers. Use the INTERNAL OFF switch on the rear panel of the GX212 to activate the external speakers connected to your ULTRATWIN.

You can also connect speakers with lower impedances. However, this could trigger the power stage protective circuitry on your GX212. Never use speakers with an impedance of less than 4 Ω. As the connected impedance goes up, the maximum power output will drop in proportion to the resistance connected.

5.3 MIDI connection

The MIDI standard (Musical Instruments Digital Interface) was developed in the early 80's to enable electronic musical instruments of different makes to communicate with each other. Over the years the range of MIDI applications has constantly expanded, and today it is completely normal to network entire recording studios using the MIDI standard.

At the heart of this network we find a computer loaded with a sequencer software that controls not only the keyboards but also effects and other peripheral devices. In such a studio you could control your ULTRATWIN in real time from a computer. In particular, when playing live gigs you can use a MIDI footcontroller to control both the effect parameters and channel/effect changes on your ULTRATWIN.

The MIDI connector on the rear of your ULTRATWIN is an internationally standardized 5-pin DIN jack. To connect your ULTRATWIN to other MIDI equipment, you need a dedicated MIDI cable, which is commercially available in various lengths. However, you can solder your own cables using 2-conductor shielded cables (e.g. microphone cables) and two rugged 180° DIN plugs: pin 2 (center) = shield; pins 4 and 5 (right and left of pin 2) = internal conductor; pins 1 and 3 (the outer pins) are not used. MIDI cables should not exceed a length of 15 meters.

☞ **Make sure that pin 4 is connected to pin 4, and pin 5 to pin 5 on both plugs.**

MIDI IN: receives MIDI controller information. The receiving channel can be set with the buttons UP and DOWN. On = Omni, i.e. MIDI data are received and processed on all channels (see section 3.2).

6. APPENDIX

6.1 Preset list

Table 6.1 on the next two pages provides you with information on effect numbers and names, parameter types and ranges as well as factory default settings.

Preset-Nr.	Effect	Variation	PARAMETER	Range	Default	EFFECT A	Range	Default	EFFECT B	Range	Default
1	SPRING REVERB	short Pre-Delay	Reverb Time	1..32	8	Mix L	0..50	10	Mix R	0..50	10
2		long Pre-Delay	Reverb Time	1..32	14	Mix L	0..50	10	Mix R	0..50	10
3	STUDIO	short Pre-Delay	Reverb Time	1..32	5	Mix L	0..50	10	Mix R	0..50	10
4		long Pre-Delay	Reverb Time	1..32	14	Mix L	0..50	10	Mix R	0..50	10
5	CHAMBER	short Pre-Delay	Reverb Time	1..32	8	Mix L	0..50	10	Mix R	0..50	10
6		long Pre-Delay	Reverb Time	1..32	15	Mix L	0..50	10	Mix R	0..50	10
7	STAGE	short Pre-Delay	Reverb Time	1..32	4	Mix L	0..50	10	Mix R	0..50	10
8		long Pre-Delay	Reverb Time	1..32	12	Mix L	0..50	10	Mix R	0..50	10
9	CONCERT	short Pre-Delay	Reverb Time	1..32	9	Mix L	0..50	10	Mix R	0..50	10
10		long Pre-Delay	Reverb Time	1..32	16	Mix L	0..50	10	Mix R	0..50	10
11	PLATE	short Pre-Delay	Reverb Time	1..32	7	Mix L	0..50	10	Mix R	0..50	10
12		long Pre-Delay	Reverb Time	1..32	13	Mix L	0..50	10	Mix R	0..50	10
13	GATED REVERB	min. Density	Gt./Rev. Time	1..32	4	Sensitivity	0..63	9	Mix	0..50	15
14		max. Density	Gt./Rev. Time	1..32	17	Sensitivity	0..63	15	Mix	0..50	10
15	AMBIENCE	min. Reflections	Room Size	0..63	32	Pre-Delay	0..63	15	Mix	0..50	10
16		max. Reflections	Room Size	0..63	63	Pre-Delay	0..63	15	Mix	0..50	10
17	WAH / DELAY / DISTORTION	Feedback 0 %	Delay Time	0..63	35	Drive	0..63	63	Delay Mix	0..50	6
18		Feedback 10 %	Delay Time	0..63	35	Drive	0..63	63	Delay Mix	0..50	6
19		Feedback 30 %	Delay Time	0..63	35	Drive	0..63	63	Delay Mix	0..50	6
20	DELAY / REV.	-	Delay Time	0..63	50	Delay Mix	0..50	7	Reverb Mix	0..50	20
21	DELAY (stereo)	min. Feedback ↓	Delay Time	0..63	43	Mix L	0..50	2	Mix R	0..50	11
22			Delay Time	0..63	63	Mix L	0..50	3	Mix R	0..50	11
23			Delay Time	0..63	20	Mix L	0..50	8	Mix R	0..50	16
24		max. Feedback	Delay Time	0..63	63	Mix L	0..50	0	Mix R	0..50	35
25	DELAY (long mono)	-	Delay Time	0..63	15	Feedback	0..63	2	Mix	0..50	8
26		-	Delay Time	0..63	25	Feedback	0..63	12	Mix	0..50	10
27		-	Delay Time	0..63	30	Feedback	0..63	15	Mix	0..50	9
28		-	Delay Time	0..63	45	Feedback	0..63	20	Mix	0..50	10
29		-	Delay Time	0..63	63	Feedback	0..63	25	Mix	0..50	10
30	PHASER	Feedback 0 %	LFO Speed	0..63	36	Depth	0..63	30	Mix	0..99	50
31		Feedback 62 %	LFO Speed	0..63	30	Depth	0..63	35	Mix	0..99	60
32		Feedback 62 %	LFO Speed	0..63	48	Depth	0..63	25	Mix	0..99	50
33		Feedback 77 %	LFO Speed	0..63	63	Depth	0..63	28	Mix	0..99	50
34	CHORUS	fat	LFO Speed	1..32	8	Depth	0..63	63	Mix	0..99	30
35		slow	LFO Speed	1..32	1	Depth	0..63	30	Mix	0..99	40
36		stereo	LFO Speed	1..32	15	Depth	0..63	20	Mix	0..99	50
37		stereo	LFO Speed	1..32	1	Depth	0..63	63	Mix	0..99	50
38	CHORUS / REVERB	ultra	Reverb Time	0..63	24	Chorus Mix	0..99	50	Reverb Mix	0..50	10
39		slow	Reverb Time	0..63	10	Chorus Mix	0..99	50	Reverb Mix	0..50	10
40		medium I	Reverb Time	0..63	10	Chorus Mix	0..99	40	Reverb Mix	0..50	10
41		medium II	Reverb Time	0..63	1	Chorus Mix	0..99	50	Reverb Mix	0..50	10
42		fast	Reverb Time	0..63	51	Chorus Mix	0..99	50	Reverb Mix	0..50	10
43	CHORUS / DELAY	ultra	Delay Time	0..63	63	Chorus Mix	0..99	50	Delay Mix	0..50	10
44		slow	Delay Time	0..63	54	Chorus Mix	0..99	30	Delay Mix	0..50	10
45		medium I	Delay Time	0..63	59	Chorus Mix	0..99	50	Delay Mix	0..50	10
46		medium II	Delay Time	0..63	48	Chorus Mix	0..99	50	Delay Mix	0..50	10
47		hold	Delay Time	0..63	63	Chorus Mix	0..99	40	Delay Mix	0..50	14
48	FLANGER	fat	LFO Speed	1..32	15	Depth	0..63	5	Mix	0..99	30
49		classic	LFO Speed	1..32	5	Depth	0..63	10	Mix	0..99	14
50		stereo	LFO Speed	1..32	20	Depth	0..63	20	Mix	0..99	24
51		stereo	LFO Speed	1..32	10	Depth	0..63	5	Mix	0..99	50

Preset-Nr.	Effect	Variation	PARAMETER	Range	Default	EFFECT A	Range	Default	EFFECT B	Range	Default
52	FLANGER / REVERB	ultra	Reverb Time	0..63	20	Flanger Mix	0..99	50	Reverb Mix	0..50	10
53		slow	Reverb Time	0..63	20	Flanger Mix	0..99	40	Reverb Mix	0..50	10
54		medium I	Reverb Time	0..63	50	Flanger Mix	0..99	50	Reverb Mix	0..50	10
55		medium II	Reverb Time	0..63	50	Flanger Mix	0..99	50	Reverb Mix	0..50	10
56		fast	Reverb Time	0..63	32	Flanger Mix	0..99	50	Reverb Mix	0..50	10
57	FLANGER / DELAY	ultra	Delay Time	0..63	63	Flanger Mix	0..99	30	Delay Mix	0..50	10
58		slow	Delay Time	0..63	53	Flanger Mix	0..99	30	Delay Mix	0..50	3
59		medium I	Delay Time	0..63	63	Flanger Mix	0..99	30	Delay Mix	0..50	10
60		medium II	Delay Time	0..63	32	Flanger Mix	0..99	50	Delay Mix	0..50	10
61		fast	Delay Time	0..63	63	Flanger Mix	0..99	30	Delay Mix	0..50	6
62	STEREO TREMOLO	-	LFO Speed	1..32	10	Pan	0..63	0	Mix	0..99	50
63		-	LFO Speed	1..32	19	Pan	0..63	0	Mix	0..99	40
64	TREMOLO / DELAY	slow	Delay Time	0..63	19	Tremolo Mix	0..99	50	Delay Mix	0..50	10
65		ultra	Delay Time	0..63	50	Tremolo Mix	0..99	50	Delay Mix	0..50	10
66		medium	Delay Time	0..63	19	Tremolo Mix	0..99	60	Delay Mix	0..50	15
67	ROTARY SPEAKER	-	Speed	0..63	9	Variation	1..32	1	Mix	0..99	50
68		-	Speed	0..63	15	Variation	1..32	10	Mix	0..99	50
69	MAGIC DRIVE	-	Delay Time	0..63	5	Variation	0..32	24	Delay Mix	0..50	1
70		-	Delay Time	0..63	63	Variation	0..32	32	Delay Mix	0..50	11
71	AUTO WAH	fast	Sensitivity	0..63	63	Depth	0..63	27	Mix	0..99	99
72		slow	Sensitivity	0..63	63	Depth	0..63	20	Mix	0..99	90
73	LFO WAH	LFO Band Pass	LFO Speed	0..63	30	Depth	0..63	45	Mix	0..99	90
74		LFO Band Pass	LFO Speed	0..63	60	Depth	0..63	40	Mix	0..99	60
75	PITCH SHIFTER	-12	Tune Left	-12..12	0	Mix L	0..99	50	Mix R	0..99	50
76		-5	Tune Left	-12..12	0	Mix L	0..99	50	Mix R	0..99	34
77		+3	Tune Left	-12..12	0	Mix L	0..99	50	Mix R	0..99	34
78		+4	Tune Left	-12..12	0	Mix L	0..99	50	Mix R	0..99	20
79		+7	Tune Left	-12..12	0	Mix L	0..99	50	Mix R	0..99	34
80		+4 %	Tune Left	-50..50	0	Mix L	0..99	50	Mix R	0..99	20
81		+8 %	Tune Left	-50..50	14	Mix L	0..99	34	Mix R	0..99	34
82	PITCH SHIFTER / REVERB	-12	Reverb Time	0..63	4	Pitch Mix	0..99	30	Reverb Mix	0..50	20
83		+3	Reverb Time	0..63	18	Pitch Mix	0..99	24	Reverb Mix	0..50	10
84		+4 %	Reverb Time	0..63	10	Pitch Mix	0..99	40	Reverb Mix	0..50	12
85		+8 %	Reverb Time	0..63	4	Pitch Mix	0..99	40	Reverb Mix	0..50	20
86	PITCH SHIFTER / DELAY	-12	Delay Time	0..63	63	Pitch Mix	0..99	40	Delay Mix	0..50	7
87		-5	Delay Time	0..63	63	Pitch Mix	0..99	34	Delay Mix	0..50	7
88		+4	Delay Time	0..63	63	Pitch Mix	0..99	20	Delay Mix	0..50	7
89		+7	Delay Time	0..63	63	Pitch Mix	0..99	20	Delay Mix	0..50	7
90	COMPRESSOR	fast	Sensitivity	0..63	30	Ratio	1..24	10	Gain	-3..12	8
91		slow	Sensitivity	0..63	30	Ratio	1..24	14	Gain	-3..12	8
92	EXPANDER	Hell	Sensitivity	0..63	35	Ratio	1..24	24	Gain	-3..12	0
93		Heaven	Sensitivity	0..63	20	Ratio	1..24	14	Gain	-3..12	0
94	GUITAR COMBO	-	Drive	0..63	30	Presence	0..63	42	Mix	0..99	99
95		-	Drive	0..63	63	Presence	0..63	63	Mix	0..99	99
96		-	Drive	0..63	63	Presence	0..63	18	Mix	0..99	99
97	SPEAKER CABINET	Stack A	HF Cut	0..63	20	Peak Gain	0..63	40	Peak Freq.	0..63	63
98		Stack B	HF Cut	0..63	30	Peak Gain	0..63	40	Peak Freq.	0..63	30
99		Combo	HF Cut	0..63	4	Peak Gain	0..63	30	Peak Freq.	0..63	10

6.2 MIDI implementation

MIDI Implementation Chart				
Function		**Transmitted**	**Recognized**	**Remarks**
Basic Channel	Default	X	OFF, 1 - 16	memorized
	Changed	X	OFF, 1 - 16	
Mode	Default	X	1,2	
	Messages	X	X	
	Altered	X	X	
Note Number		X	X	
	True Voice	X	X	
Velocity	Note ON	X	X	
	Note OFF	X	X	
After Touch	Keys	X	X	
	Channels	X	X	
Pitch Bender		X	X	
Control		X	O 7, 10 - 15, 18	see add. table
Progr. Change			O (0 - 98)	123 = CLEAN 124 = OVERDRIVE
	True #	X	1 - 99	127 = Effect Bypass
System Exclusive		X	X	
System Common	Song Pos.	X	X	
	Song Sel.	X	X	
	Tune	X	X	
System Real Time	Clock	X	X	
	Commands	X	X	
Aux Messages	Local ON/OFF	X	X	
	All notes OFF	X	X	
	Active Sense	X	X	
	Reset	X	X	
Notes				
O = YES, X = NO Mode 1: OMNI ON Mode 2: OMNI OFF				

Tab. 6.2: MIDI implementation

Parameter Name	Display Range	Midi Control Number	Control Value Range
Volume Controller	-	7	0 .. 127
Channel	CLEAN = 0, OVERDRIVE = 1	10	0 .. 1
Effect	OFF = 0, ON = 1	11	0 .. 1
Parameter	depends on effect	12	0 .. 127 (max.)
Effect A	depends on effect	13	0 .. 127 (max.)
Effect B	depends on effect	14	0 .. 127 (max.)
Wah/Modulation Controller	-	15	0 .. 127
Store Enable Controller	-	18	0 .. 127

Tab. 6.3: MIDI control changes of the ULTRATWIN

7. SPECIFICATIONS

AUDIO INPUTS

Connector	1/4" mono jack
Type	RF filtered input
Guitar input	
impedance	approx. 1 MΩ unbalanced
Insert return	
impedance	approx. 50 kΩ unbalanced
Aux input	
impedance	approx. 10 kΩ unbalanced
Slave input	
impedance	approx. 30 kΩ unbalanced
Tape input	
connector	RCA
impedance	approx. 10 kΩ unbalanced

AUDIO OUTPUTS

Connector	1/4" mono jack
Type	line level output
Insert send	
impedance	approx. 1 kΩ unbalanced
Line output	
impedance	approx. 100 Ω unbalanced
max. output level	+12 dBu unbalanced
Tape output	
connector	RCA
impedance	approx. 100 Ω unbalanced
max. output level	+12 dBu unbalanced

LOUDSPEAKER OUTPUTS

Connector	1/4" mono jack
Load impedance (nom.)	8 Ω

SYSTEM SPECIFICATIONS (power amplifier)

Power amp output	2 x 60 Watts RMS @ 5 % THD + N into 8 Ω; 230 V ~

MIDI INTERFACE

Type	5-pin-DIN-socket, MIDI IN

DIGITAL PROCESSING

Converters	24-bit sigma-delta, 64/128-times oversampling
Sampling rate	46.875 kHz

DISPLAY

Type	2-digit numeric LED-display

LOUDSPEAKER

Type	2 x 12" heavy duty loudspeaker, model SHARK 12G100A
Impedance	8 Ω
Power handling	100 Watts

POWER SUPPLY

Mains voltages	USA/Canada	120 V ~, 60 Hz
	U.K./Australia	240 V ~, 50 Hz
	Europe	230 V ~, 50 Hz
	general export model	100 - 120 V ~, 200 - 240 V ~, 50 - 60 Hz
Power consumption	approx. 30 Watts min. / approx. 200 Watts max.	
Fuse	100 - 120 V ~ : **T 5 A H**	
	200 - 240 V ~ : **T 2.5 A H**	
Mains connection	standard IEC receptacle	

PHYSICAL

Dimensions (H * W * D)	approx. 18.5" (469,9 mm) * 26.68" (677.6 mm) * 9.84" (250 mm)
Weight	approx. 21.0 kg

8. 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. Subsequently, the product must be returned in its original shipping carton, together with the return authorization number to the address indicated by BEHRINGER.

3. Shipments without freight prepaid will not be accepted.

§ 4 WARRANTY REGULATIONS

1. Warranty services will be furnished only if the product is accompanied by a copy of the original retail dealer's invoice. Any product deemed eligible for repair or replacement by BEHRINGER under the terms of this warranty will be repaired or replaced within 30 days of receipt of the product at BEHRINGER.

2. If the product needs to be modified or adapted in order to comply with applicable technical or safety standards on a national or local level, in any country which is not the country for which the product was originally developed and manufactured, this modification/adaptation shall not be considered a defect in materials or workmanship. 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:

- misuse, neglect or failure to operate the unit in compliance with the instructions given in BEHRINGER user or service manuals.
- 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.
- 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 buyer's 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 buyer's 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.

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