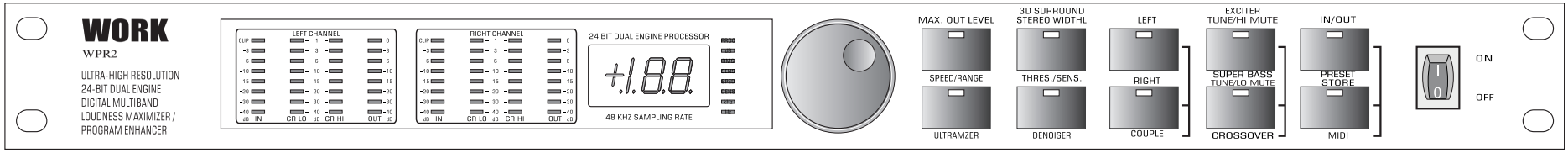
WORK

LOUDNESS MAXIMIZER/PROGRAM ENHANCER/COMPRESSOR/CROSSOVER **WPR2**



User's Manual

Version 1.0

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.

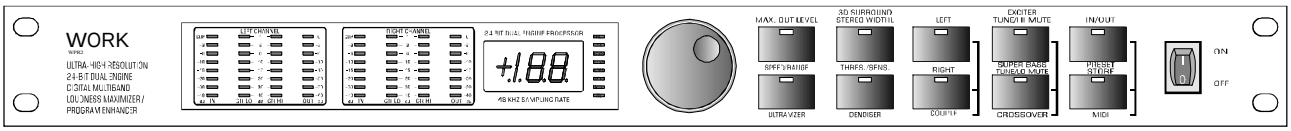
This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Read the manual.

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 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.

WORK

WPR2



- Doubles the loudness of your Recordings and Sound Reinforcement Systems without any distortion
- Ultimate Mastering Machine maximizes signal energy with absolutely " inaudible" and transparent compression
- Variable band-split compression eliminates virtually any gain intermodulation effects, such as "bass pumping" etc.
- Multiband "Brickwall" Limiter protects against any clipping and dangerous sound pressure levels
- Built-in Denoiser and Exciter for noise-free and ultra transparent sound
- 3D Stereo Surround Processor provides unbelievable spatial enhancement and improved stereo imaging
- Super Bass Enhancer psycho-acoustically creates an incredible bass sound below your loudspeaker's frequency range
- Incorporated Leveler for constant average output level while retaining the instantaneous dynamics
- 24-bit A/D and D/A Converters with 64/128 times oversampling for ultra-high headroom and resolution
- Internal 24-bit processing with professional 48 kHz sampling rate
- Servo-balanced Inputs and Outputs on gold plated XLR and TRS jack connectors for high signal integrity
- 50 user preset Memories to store programs for instant recall
- Accurate eight-segment LED Level and Gain Reduction meters for optimum performance
- Full MIDI capability allows real-time parameter control and program selection

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1. CONTROL ELEMENTS

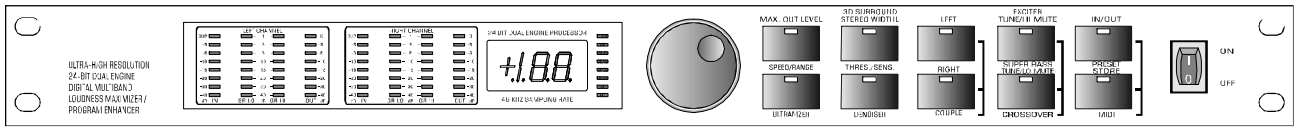

Fig. 1.1: WPR2 front panel

The WPR2 is equipped with ten illuminated parameter keys, one jog wheel (rotary control), a numeric display, 8 LED indicators and a power switch. Each of the two fully independent channels can be monitored with four 8-stage LED meters, displaying input level, output level and gain reduction for both bands.

1.1 Front panel

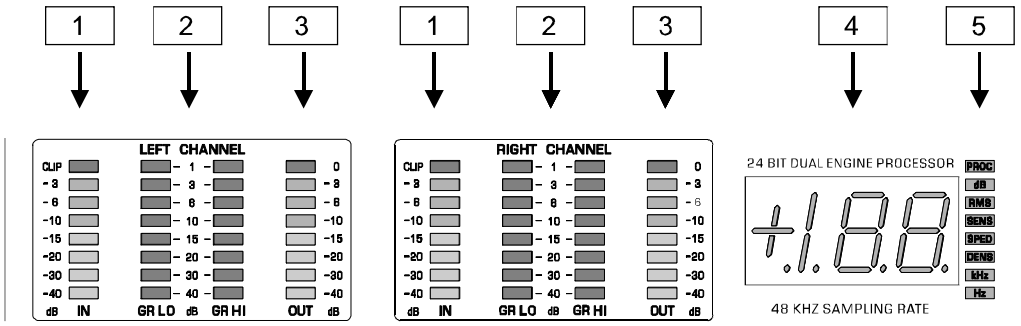

Fig. 1.2: Display section WPR2

1 The two LED chains read the input signal level in dB, referenced to the internal digital maximum.

Please note that the nominal level of the WPR2 can be selected with the + 4 dB / -20 dB level adjusment on the back panel. (see 3.1 "level setting")

2 The gain reduction meters show the applied gain reduction. Gain reduction is shown for both frequency bands. GR LO shows the gain reduction in the lower and GR HI in the higher frequency band.

3 These two OUT LED chains read the output signal level in dB, referenced to the maximum output level of +15 dBu.

4 After power-up, the LED display reads the number of the preset last used. This clearly legible, $2_{1/2}$ digit numeric display has plus/minus indicators to show that parameters are being incremented or decremented in Edit mode.

5 Next to the display, the appropriate unit lights up to indicate the correct value which is being edited. These eight LED illuminated units are very important with keys which can represent more than one parameter.

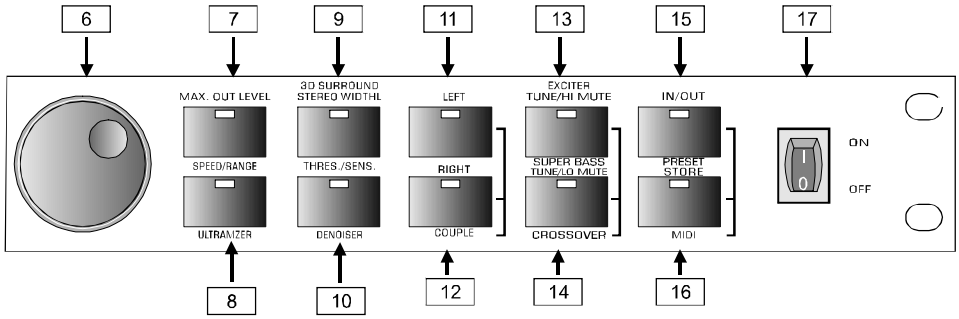

Fig. 1.3: Function keys and jog wheel

6 With the jog wheel, a continuous rotary control, you can freely edit the selected parameters. Turn the wheel clockwise to increase the values or counter-clockwise to reduce them.

☞ **When you press the PRESET key once, you can use the wheel to select a program directly, which is shown by a dot lighting up in the display. While this dot is on, you can select a program though its settings will not take immediate effect. When the jog wheel has not been touched for a short time, the LED in the display disappears and the program is loaded.**

7 Use the MAX.OUT LEVEL to set the output limiter.This value can be set from-48 to 0 dB.The dB value will lightup next to the numeric display. You can change the MAX. OUT LEVEL parameter from peak to RMS mode by pressing the MAX.OUT LEVEL key for about 2 seconds.RMS means the setting of an average level for the MAX. OUT LEEL parameter. Peak stands for a peak value. To make clear that you are in **"RMS"** mode will light up in the display.45

8 The Ultramizer function enables you to maximize the perceived loudness of the program material.The ULTRAMIZER key gives you access to three parameters:

a) When pressed once the DENSITY (**"DENS"** will light up in the display) can be adjusted. The subjectively felt density of the program material is the result of the amount of compression that is applied. The DENSITY can be adjusted from 0 (no compression) to 100 (extreme dynamic gain reduction).

b) Pressed a second time, the SPEED of the Ultramizer function can be set (**"SPED"** will light up in the display). This parameter is very important for the dynamic behavior which depends on the application.Generally low SPEED settings are suited if the ULTRAMIZER is to work rather **"**inaudibly**"** Higher SPEED is required when short level changes should be levelled.

c) Pressed third time, the RANGE can be set (**"dB"** will light up in the display). This parameter determines the maximum amplification the Ultramizer function may use in order to achieve the desired DENSITY and MAXIMUM OUTPUT LEVEL. The value can be adjusted from 0 to 24dB.

For further information on the Ultramizer function please refer to section 2.1.1.

9 Use the 3D SURROUND key to increase the stereo width of the signal. Setting can range from 0 (no processing) to 100.

10 With the DENOISER key you have access to two parameters which influence the process.

a) When pressed once the THRESHOLD of the Noise Gate can be set (**"dB"** will light up in the display) The value ranges from -90 dB to 0 dB. **"OF"** means the Denoiser function is deactivated.

Please bear in mind that when the threshold number displayed is small, the threshold level in fact is high and consequently only loud signals will pass through. When the value is lowered to -100 dB for example (referring to the digital maximum) every signal will pass.

b) When pressed a second time the SENSITIVITY can be adjusted (**"SENS"**will light up in the display). This governs the sensitivity of the dynamic high cut filter and how it reacts to the input signal. The value ranges from 0 to 100.

11 When the LEFT key is pressed only the settings for the left channel are edited.

12 Use the RIGHT key to select the right audio channel.

If you wish to process the left and right audio channels simultaneously(COUPLE mode), press both LEFT & RIGHT keys together. In couple mode both key LEDs light up. Whenever you edit one of the two audio channels and then switch to couple mode, the parameters of the active channel will be copied to the other; i.e. If you press LEFT before RIGHT, left will be copied to right.

13 The EXCITER key has three functions:

a) PROCESS, (**"PROC"** will light up) when pressed once the intensity of the Exciter function can be adjusted ranging from 0 to 100.

b) Pressed a second time the TUNE parameter can be set (**"Hz"** will light up). The TUNE control sets the lower cut-off frequency of the Exciter function. The cut-off frequency can be adjusted within a range of 4 to 11 kHz.

c) The third function is reached by pressing the EXCITER key for more than 2 seconds. The upper frequency band is then muted. This is indicated by a full LED bar that flashes on and off (GR HI). This function is useful when you want to monitor the processing of the WPR2. Alternatively the unit can also be used as a crossover to generate a subwoofer signal for instance.

14 The SUPER BASS key has three functions:

a) PROCESS, when pressed once the intensity of the Super Bass function can be adjusted ranging from 0 to 100 ("PROC" will light up).

b) Pressed a second time the TUNE parameter can be set ("Hz" will light up). Here the TUNE control sets the upper cut-off frequency of the Super Bass function. The cut-off frequency can be adjusted within a range of 50 to 150Hz

c) Again the third function is reached by pressing the SUPER BASS key for more than 2 seconds. The lower frequency band is now muted. This is indicated by a full GR LO LED bar that flashes on and off.

When the EXCITER and SUPER BASS keys are pressed simultaneously, the crossover frequency, between - the lower and higher bands of the multiband compressor - can be adjusted from 20 Hz to 20 kHz.

15 The IN/OUT key enables you to bypass the DSP PDAC IV. The green LED lights up as soon as the WPR2 is activated.

16 Whenever a setting has been changed the PRESET key starts to blink slowly, indicating that a preset has been changed but not stored. When the PRESET key is pressed once the current preset number is shown in the numeric display. When the PRESET key is pressed again the current preset number starts flashing, you can then select any of the 50 memory locations. Press a third time to save the edited program to a user preset as shown in the display.

When the IN/OUT and PRESET keys are pressed simultaneously the WPR2 enters the MIDI menu, where all MIDI settings can be edited.

17 Use the POWER switch to switch the WPR2 on or off.

1.2 Back panel

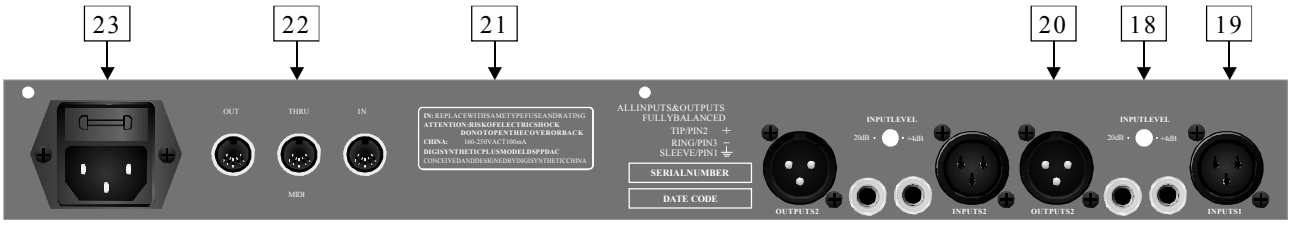

Fig. 1.4: Back panel connectors and control elements

18 Use the OPERATING LEVEL switch to adapt the WPR2 to different operating levels. You can select a -10 dBV semi-pro level used for home recording and a +4 dBu level used in professional studios. This way the WPR2 is always optimally adapted to the used nominal operating level.

19 These are the WPR2' analog INPUTS. TheWPR2 has both XLR and jack inputs and outputs. Each XLR and jack set is wired parallel and can be used either balanced or unbalanced.

20 These are the WPR2'S analog OUTPUTS.Also on balanced or unbalanced XLR or TRS jacks.

21 Please take the time to complete the enclosed Warranty Registration Card. Put the instruction manual in a safe place and return the completed Warranty Registration Card to us within 14 days of purchase, making sure that the dealer stamp has been acquired.

22 These are the WPR2'S MIDI connectors (MIDI OUT / THRU / IN). Via these connectors total remote control is possible.

23 This is the MAINS CONNECTOR / FUSE HOLDER / VOLTAGE SELECTOR. Before you connect the unit, please make sure that the displayed voltage corresponds to your Mains supply. Please note that the AC voltage selection is defined by the position of the Fuse Holder. If you intend to change the operating voltage, remove the Fuse Holder and turn it by 180 degrees before you reinsert it.Matching the two markers monitors the selected voltage. Please note that, depending on the mains voltage supplied to the unit, the correct fuse type and rate must be installed (see Chapter 6.2 "Specifications"). Please use the enclosed mains cable to connect the unit to the mains power supply.

Please note that not all appliances can be used with different mains voltage ratings. Please check the description on the back of the unit and the box.

1.3 Restoring factory defaults

To protect the WPR2 against user errors, an important edit command has been implemented via a particular key combination. In normal operating mode the presets cannot be reset to their factory defaults, so as to secure your own programs as safely as possible. Please proceed as follows to reinitialize the preset default settings:

Press and keep the keys Effect and PRESET before powering up The WPR2. Then switch on The WPR2 and keep the two keys pressed for about two seconds. The program numbers are counted up and reset to their original default settings.

2. OPERATION

The WPR2 is one of the latest generation digital processing devices. Especially designed for processing the total mix or complex music signals. WORK past experience in digital and analog processing devices come together in this new device. In the WPR2, the advantages of digital technology go hand in hand with the warm and powerful sound of analog devices. The WPR2 combines multiple functions for the processing of stereo signals in one device. It is a multi-band Compressor, a 3D-Surround Processor, a Denoiser as well as an Exciter and a Bass Processor. Despite this unbelievable processing power the WPR2 can be intuitively operated with an audio quality previously unimaginable.

2.1.1 The Ultramizer function

With The Ultramizer function you can increase the loudness and density of the program material. The WPR2 analyzes the received music material and adapts the settings automatically. The function of the Ultramizer is dependent on the the setting of the RANGE parameter. When the RANGE parameter is set relatively high, the Ultramizer function will perform these two actions:

- The Uitramizer function adjusts the parameters of the compressors to achieve the desired (set) DENSITY in both bands.
- The total volume is raised to the MAX OUT LEVEL The total gain is adjusted in a way that the output limiter will have a slight gain reduction. All relative parameters are continuously monitored to keep the DENSITY at whatever level you have set.

When the RANGE parameter is set at zero or a small value, the total output will not increase (or only slightly increase). Only the DENSITY will be increased, resulting in a gain reduction at the output. This setup is advisable when an increase of the gain is unwanted, for instance in live applications where an unexpected in crease in gain can lead to feedback.

ULTRAMIZER DENSITY

After pressing the UITRAMIZER key once, you have access to the parameter DENSITY. DENSITY is a combination of Parameters governing the perceived density of the signal.

ULTRAMIZER SPEED

After pressing The ULTRAMIZER key a second time, the parameter SPEED can be set. This is the relative speed with which the parameters of the compressor, limiter and gain at the input will be altered to adapt to the incoming audio. Choose a low speed when theUltramizer function must do its job inaudible and high speed when fast recovery from transients is needed.When low speedsare chosen theUltramizer functionwill adapt slowly to new incoming signals, although the limiter will still perform as a "brick wall" limiter which will affecttransients.

ULTRAMIZER RANGE

The parameter RANGE, which you access after pressing the UITRAMIZER key three times, determines the maximal gain the Ultramizer function will apply to the signal. This way, fade ins and fade outs remain unaffected. It is even possible to set this value to zero so that no amplification is allowed but the density will increase when a high enough level is applied to the input. When the applied signal reaches the MAX OUT LEVEL the signal will be compressed and limited by the multiband compresser and the output limiter. This will prevent distortion while maximizing the loudness, without the risk of feedback caused by an increase in gain during the quiet(er) moments. This function is particularly useful when using the WPR2 live, where unexpected gain increase may cause feedback. The RANGE can be set from 0 to 24 dB.

2.1.2 The Max. Out Level function

Integrated in the design of the WPR2 is its limiter function. Key value in almost all functions is the maximum output level that is set here. This value is a so called "brick wall" that cannot be exceeded under any circumstances when The WPR2 is engaged. The level can be set from -48 dB to 0 dB, with reference to the internal digital level ("dB" will light up in the display). 0 dB corresponds to +16dBu This level is simply set by the following steps:

1. Set the MAX OUT LEVEL to a low value.
2. Apply a signal to the input of The WPR2 that is loud enough to be limited constantly.
3. Slowly turn the MAX OUT LEVEL up until the clip LEDs of the connected power amplifier light up occa -sionally.

After determining the correct MAX OUT LEVEL the preset can be stored to recall at any time the same amplifier and speakers are used.

You can adjust the MAX. OUT LEVEL parameter in two different ways: The peak and RMS mode. In peak mode you can adjust a maximum peak value which will not be exceeded. In RMS mode you set an average maximum level. You can switch between these two modes by pressing the MAX. OUT LEVEL key for about 2 seconds. Additionally the "RBS" LED in the display will light up.

2.1.3 The Exciter function

The WPR2's Exciter function adds transparency and depth to the audio signal. Classical music material gains transparency and musicality while popular music keeps the desired brilliance. Two parameters govern the performance of the Exciter function, both can be accessed by means of the EXCITER key.

EXCITER PROCESS

When pressed once you gain access to the Exciter PROCESS parameter. The "PROC" LED next to the numeric display will light up to show this. Now you can set the intensity of the Exciter effect within the range of 0 to 100.

EXCITER TUNE

When pressed twice you have access to the TUNE parameter. Here this is the lower frequency limit of the Exciter function. This can be set from 4 to 11 kHz. The "kHz" LED beside the numeric display lights up to display the unit of the edited parameter.

2.1.4 The Super Bass function

The Super Bass function is the low frequency equivalent of the Exciter function. Designed to process the low frequency portion of the signal and to add transparency and depth.

SUPER BASS PROCESS

If you press the SUPER BASS key once you can access the Super Bass PROCESS parameter, which determines the intensity of the Super Bass function. The value can be set from 0 to 100 while the "PROC" LED lights up.

Be careful not to overload your power amplifiers or loudspeakers when you use an extreme setting of the PROCESS parameter of the Super Bass function. Remember, less is more.

SUPER BASS TUNE

When pressed twice you have access to the Super Bass TUNE parameter. This is the upper frequency limit of the Super Bass function. This can be set from 50 to 150 Hz. The "Hz" LED beside the numeric display lights up to display the unit of the edited parameter.

2.1.5 The 3D Surround function

With the the 3D Surround function the WPR2 can be used as a 3D stereo Surround Processor, increasing the stereo width of the program material. Whether you want to process individual instruments or the entire mix, you can set the 3D Surround function "on the fly". The effect makes the sound more spacious, wider and more full. Since this Function does not make any sense with two mono signals, the COUPLE mode must be activated to activate the 3D Surround function

When you use extreme setting with the 3D Surround function on heavily reverberated audio material, the reverb can sound unnatural and too intense. This is caused by the way stereo reverbs operate. Remember, less is more.

2.1.6 The Denoiser function

The WPR2'S Denoiser function is universally applicable and suited for all types of instrument and complex signals. The algorithm of the Denoiser function does not produce unpleasant side effects like pumping or noise trails. The parameters are for a large part chosen automatically depending on the program material and the two parameters, which can be accessed with the DENOISER key.

DENOISER THRESHOLD

When the DENOISER key is pressed once, the THRESHOLD can be set. This function reflects the Noise Gate and is used to remove unwanted noise during the pauses. When the Denoiser THRESHOLD is being set the "dB" LED beside the numeric display lights up. The setting can range from -90 dB to 0 dB (no signal reaches the output). "OF" means the Denoiser function is deactivated.

DENOISER SENSITIVITY

When the DENOISER key is pressed twice you can edit the parameter SENSITIVITY. With this parameter you determine the sensitivity of the dynamic high cut filter. This function is highly useful to remove noise from the music signal. To indicate that the sensitivity is being edited the "SENS" LED beside the numeric display lights up.

The optimal adjustment of the SENSITIVITY parameter depends strongly on the type of noise and program material. Take the time to set the SENSITIVITY parameter with care.

2.1.7 The Crossover parameter

The advantage of multiband processing is in the division of the audio spectrum into several bands, in order to avoid the negative effects of spectral intermodulation. The choice of the crossover frequency which divides the bands has influence on how the processing takes place. With complex composite signals the crossover frequency should be in the bass area (±200 Hz e.g. in order to prevent modulation of the mid and high frequency range by the energy produced in the bass area). With single instruments and vocals however, a higher crossover frequency is more desireable (2 kHz), since the center point of the power spectrum is shifted here.

For complete flexibility the crossover frequency can be set anywhere from 20 Hz to 20 kHz, in 31 steps according to the ISO frequencies. This enables the WPR2 to be used not only as a mastering device but also as a processor for single instruments and vocals. If you set the crossover frequency to the maximum or minimum value (20 Hz or 20 kHz), the WPR2 will operate as a broadband compressor.

Feel free to experiment with different crossover frequency settings and pretty soon a feeling for the right setting will arise, making the WPR2 that much more effective and useful.

2.2 Selecting presets

The WPR2 stores 50 user-definable presets. After power-up, the unit automatically recalls the preset last used. To select another preset, make sure that the PRESET key is pressed once. Use the jog wheel to enter the preset number of your choice. Turn the wheel clockwise to increment the preset number, or counter-clockwise to decrement it.

Please note that the WPR2 generally activates the newly selected presets only after abo-ut one second, which is indicated by a dot in the lower right corner of the display. After loading the data, the WPR2 enables the preset and the dot disappears. This brief interruption avoids the direct activation of every preset, as you scroll through the preset list with the jog wheel. Thus, the WPR2 makes sure that no "unwanted" presets are loaded unintentionally. Additionally, you can rotate the jog wheel at high speed and still have the time to specifically select the preset of your choice, instead of any of its "neighbours".

2.3 Editing presets

Editing presets is easy on the WPR2. Basically, all essential parameters can be selected directly via the keypad and edited with the jog wheel. Some key have multiple function that can be accessed by pressing that particular key repeatedly.

Use the LEFT and RIGHT keys to edit the left or right audio channel settings. Of course, you can edit both channels at the same time in COUPLE mode.

Whenever you edit one of the two audio channels and then switch to couple mode, the parameters of the active channel will be copied to the other; i.e. if you press LEFT before RIGHT, left will be copied to right. Finally, you can also save the edits made to the preset.

2.4 Saving presets

Use the PRESET key to save an edited preset. Basically, all parameter changes can be saved. Whenever you are editing a preset, the display starts flashing to indicate that the edits will be saved only when you confirm them by pressing the PRESET key twice. Example:

- You recall a preset for editing. Then you edit the preset as desired using the function keys and the jog wheel. During this process, the flashing PRESET key reminds you that the preset settings have been changed but not saved yet. Press the PRESET key once. The display reads the current preset number. When pressed again this number starts flashing. To keep the original preset, use the jog wheel to select another preset that can be overwritten. Press the PRESET key a third time to save the edits to the selected preset. If you wish to overwrite the original preset, simply press the PRESET key three times (after editing) to save all changes you have made.

Whenever you have edited a preset and pressed the PRESET key three times, all previous settings in this preset are erased and overwritten with the new parameter values. However, if you wish to keep the original preset, use the jog wheel to select another preset before you press the PRESET key a third time.

2.5 MIDI control

Use the MIDI key combination to select the MIDI parameters you wish to adjust. For this purpose press and keep the IN/OUT and the PRESET keys for about two seconds. All parameters can be edited with the jog wheel and the IN/OUT key. The MIDI menu includes six pages which you can select by pressing the IN/OUT key (forwards) and the PRESET key (backwards) several times.

On the first page you can select the MIDI channel. The display reads a small "c" (= channel). The jog wheel adjusts a channel from 1 through 16. To switch off the MIDI function simply select the "0" value(displayed as "-").

On the second page you can select MIDI Omni mode, i.e. the unit transmits/receives on all 16 MIDI channels. The display reads "O" (=Omni). Use the jog wheel to activate ("1") or deactivate ("0") Omni mode.

The third page allows for configuring controller commands. On its right-hand side, the display reads a capital "C" (=Controller). The jog wheel selects one of the following four controller modes:

Display	Mode
0	No controller data is transmitted
1	Controller data is received but not transmitted
2	Controller data is transmitted but not received
3	Controller data is transmitted and received

Tab. 2.1: Controller settings

The fourth page gives you access to the program change setup. The display reads a capital "P" (=Program). Here, too, four modes can be selected with the jog wheel, as follows:

Display	Mode
0	No program change data are transmitted
1	Program change data are received but not transmitted
2	Program change data are transmitted but not received
3	Program change data are transmitted and received

Tab. 2.2: Program change settings

The fifth page of the MIDI menu shows the "store enable" flag represented by a capital "S" in the display. Thevalue"0" disables the reception of controller #15, and therefore protects the user presets from being modifiedvia MIDI. Accordingly, the value "1" enables MIDI controller #15 so that you can modify or replace presetswith a remote MIDI device or a sequencer. In this case the actual settings will be stored directly to the locationthat corresponds to thecontroller value.

Attention! Since the "store enable" mode allows you to access memory locations directly via MIDI, it is possible that stored presets will be replaced or altered if controller #15 messages are sent on the same MIDI channel. The purpose of this mode is to facilitate MIDI backup and restore operations without express confirmation at the WPR2. It is therefore recommended to disable (flag=0) this mode as soon as the intended data transfer has ended. This is done automatically when you switch off the WPR2.

On the sixth page you can access the "System Exclusive" functions. This is indicated by a "d" (for dump) in the display. To the left of this "d" a number is displayed:

"d0"means that no SYSEX data will be sent or accepted. "d1" will enable the WPR2 to receive data. When PRESET is pressed the unit will wait for data, this is shown by flashing dots (LEDs) in the display.The MIDI button LED flas signaling that SYSEX data is being received. "d2" will enable the WPR2 to send a "bulk dump". Start your sequenc and press PRESET on the unit to start the transmission.

If you press the IN/OUT key again on the sixth page, the WPR2 quits MIDI setup mode.

To load these settings again, select "d1" press PRESET and start your sequencer. If you press IN/OUT again, you will leave the MIDI setup. You can at all times press any other key to leave the MIDI setup directly.

During a bulk dump all audio functions of theWPR2 will be deactivated.

The full-featured MIDI implementation of the WPR2 allows for easily integrating the WPR2 into any MIDI system. For detailed information on controller tabs please refer to section 4.1.

- **MIDI IN**

Any MIDI data sent to the WPR2 (sequencer, MIDI footswitch, etc.) are received via the MIDI IN jack. For example, if you wish to use the WPR2 as an effects device for your guitar rack, you can connect the MIDI IN jack to a MIDI footswitch that allows for selecting program presets. If your rack includes another MIDI effects device (e.g. a multi-effects processor), the data sent from the MIDI footswitch can be routed a theWPR2 MIDI THRU jack to your multi-effects processor.

- **MIDI THRU**

The MIDI THRU jack is used to loop through incoming MIDI data, i.e. any control data received at the MIDI IN of the WPR2 will be transmitted via the MIDI THRU jack to other MIDI devices/ instruments.

- **MIDI OUT**

The MIDI OUT jack allows for transmitting MIDI data that originate from the WPR2. We are currently developing a software editor which will allow for storing single items of the unit`s internal data on an external medium. Thus, it will be possible to archive WPR2 settings and presets on a computer, sequencer or MIDI data recorder. Both MIDI Control Change and MIDI Program Change commands will be transmitted when you edit or recall filter settings. .

3. APPLICATIONS

The WPR2 features a high level of flexibility. The following chapter describes some other possible applications for your WPR2

3.1 Level setting

Take care to set levels properly on the WPR2

Use the input level meter of the WPR2 to adjust the input signal to about -10 dB. Make sure that the CLIP LED never lights up!

3.2 Using the C-MARK in a studio environment

With its highly flexible configuration the WPR2 also delivers good results in a professional studio or home recording environment. When used as a mastering device while recording or copying the WPR2 should be placed between source and recorder as shown in fig 3.1. You can realize any application ranging from slight processing to the total manipulation of music signals. For example, you can use the WPR2 as a Loudness Maximizer, Limiter and the Denoiser system at the same time when copying analog tapes.

3.2.1 The WPR2 in analog recording

In the recording and duplication field the goal should always be to achieve an optimum recording level onto the recording media. Too low or too high recording levels lead to side effects such as noise, distortion etc. In mastering and multitrack recording, as well as in duplication, one should always take care to utilize the full dynamic range of the tape recorder, DAT recorder etc. Principally, it is possible to control the recording level by "riding" faders, which means with low level signals, the gain is increased, whereas the amplitude of high level signal is reduced. It is obvious that this method is insufficient because, especially in live recordings, the expected signal levels cannot be anticipated correctly. Especially with multitrack recordings, which are run under hectic circumstances, the signal level of all channels cannot be monitored and controlled at the same time. Generally, with manual control, it is not possible to achi eve satisfying recording results.

An automatic gain control system achieves better and more constant results. Use the WPR2 by starting with the initial settings, and use its dynamic control functions in order to be able to drive an analog, as well as a digital recording, up to the limit of its maximum dynamic range while remaini

3.2.2 The WPR2 in digital recording and sampling

In an analog recording, too low recording levels lead to an increased noise level, whereas too high levels will cause a compressed and "squashed" sound. In extreme cases, it will cause distortion due to tape saturation. In contrast to analog, side effects in the digital field always become extremely audible: with decreasing level, a tape previously recorded with insufficient level loses resolution: the recording sounds "hard" and loses "atmosphere". With excessive level, the recording sounds harsh and heavily distorted. In order to avoid these effects, the Peak Limiter section of the WPR2 should be placed before for example a sampler. The Peak Limiter is set with the MAX OUT LEVEL value. As a result of this process, a digital recording or a sampling event can be optimally set in level without any problem.

3.2.3 The WPR2 in mastering

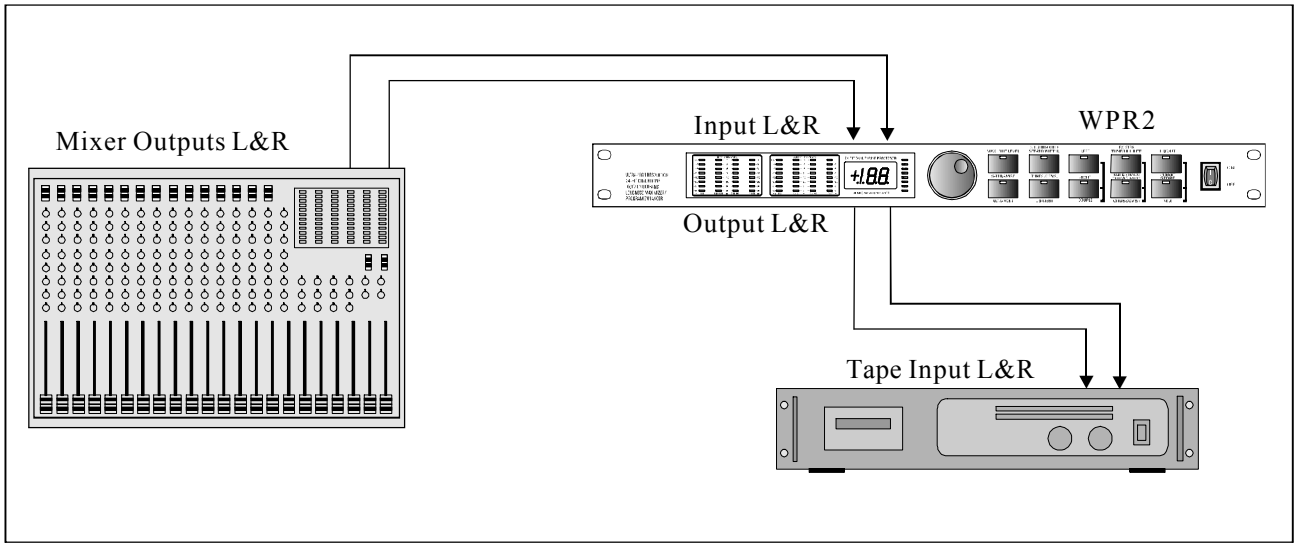

Fig. 3.1: The WPR2 as mastering device

The mastering process is one of the most critical processing steps in recording. In this production step, it is the goal to achieve a "maxinum level" copy of the recording, without any noise or distortion. In many applications it is further required to produce a high average volume. Quite often in these cases, dynamics suffer drastically, because the program material has been compressed and limited too heavily. Using the Compressor and the Peak Limiter section of the WPR2 allows you to drastically increase the overall volume, without audibly affecting the dynamics.

Proceed as follows:

1. Limit the dynamics of the program material by 6 dB using the Peak Limiter section. By softly clipping just the transients, the real audio signal will not be limited, resulting in a higher headroom. The overall gain can now be increased by 6 dB, which leads to a higher volume. More than 6 dB should not be limited, otherwise side effects could become audible.

The "cut" signal peaks cause a reduced recording level of about 6 dB, which is visible on the level indicators of the DAT recorder. Now increase the recording level of the recorder back to normal. The result is a louder recording without any loss of sound.

3.3 The WPR2 as a protective device

Sound system distortion is usually a result of amplifiers and loudspeakers being driven beyond their limitations, whereby signals are hard limited by so-called "clipping" of the amplifiers. The signal peaks are thereby "clipped" because the maximum output voltage is reached, which leads to unpleasant and for loudspeakers dangerous distortions.

Apart from the danger of long term overload a loudspeaker can also be damaged by an occasional high level overload, e.g. the sound of a microphone falling onto a hard floor. In order to protect a system or the loudspeakers, the application of the WPR2 is recommended. Conventional limiter must restrict the maximum output level far below the clip-point of the amplifier, in order to limit the height and duration of overloading transients. This has the disadvantage that the power reserve of the system cannot be fully exploited.

3.4 The WPR2 in a MIDI setup

Owing to the integrated MIDI interface you can fully control the WPR2 in a MIDI Setup. The WPR2 can both receive and transmit Program CHANGES and CONTROLLER CHANGES.
Wire the unit as follows.

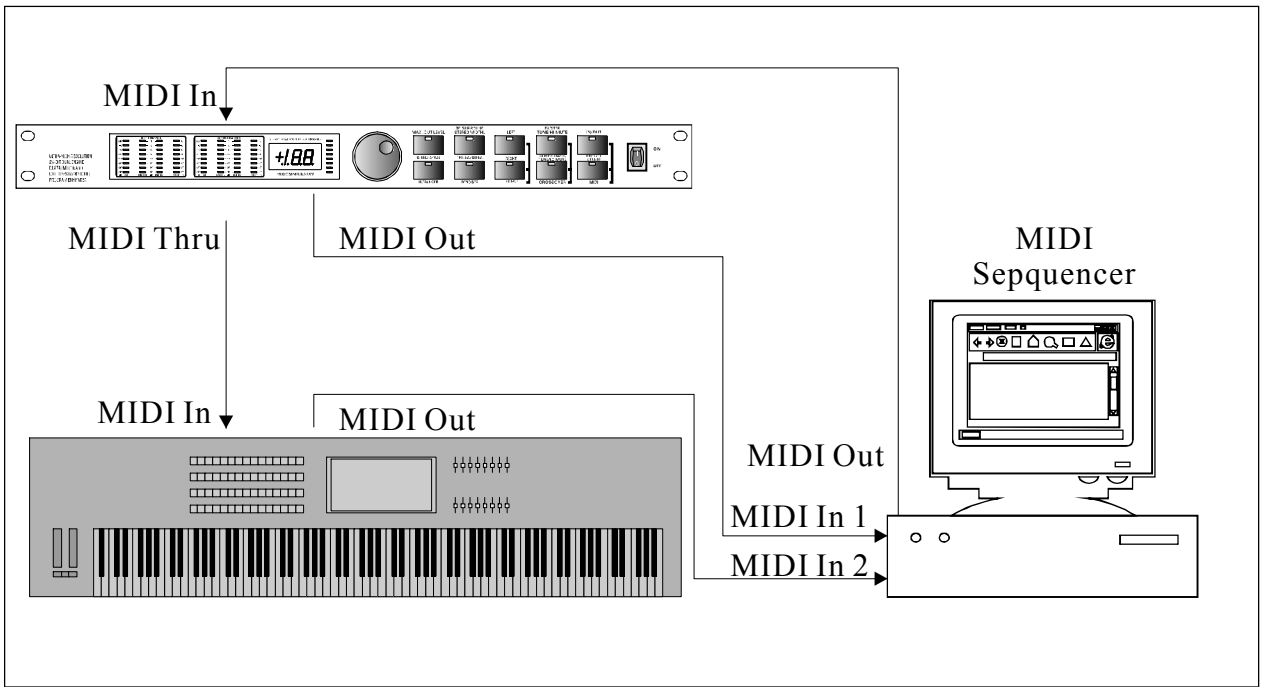

Fig. 3.2: The WPR2 in a MIDI setup

3.5 Saving data via MIDI

The WPR2 s MIDI implementation also allows for archiving one or several presets on an external storage medium. Proceed as follows:

Connect the MIDI OUT jack of the WPR2 to the MIDI IN jack of a MIDI data recorder (e.g. sequencer). Press the PRESET and IN/OUT keys simultaneously to enter MIDI mode. Set program change mode to 0 and controller change mode to 3. Now quit MIDI mode by pressing the PRESET key. Use the jog wheel to select the preset whose data you wish to save. When the preset is activated its parameters are transmitted as controller data and can be recorded on a sequencer or similar device. Repeat this routine until all presets of your choice have been sent to the external data recorder.

To load archived data back into the WPR2, you must enable controller reception in MIDI mode (see 2.5). Then, start the sequencer to automatically transmit each preset data set back to the WPR2. Press the PRESET key, select a program location to store the data and then again press the PRESET key. If you want to automate MIDI store functions you must enable the store mode, to switch on the reception of controller #28. This allows you to directly store any modification of the actual preset on the preset number that is transmitted with the controller. You can also restore a complete preset thathas previously been recorded with a MIDI sequencer on the same location it had before.

4. APPENDIX

4.1 MIDI implementation

MIDI Implementation chart				
Function		**Transmitted**	**Recognized**	**Remarks**
Basic	Default	OFF, 1 - 16	OFF, 1 - 16	memorized
Channel	Changed	OFF, 1 - 16	OFF, 1 - 16	
	Default	1,2,3,4	1,2,3,4	
Mode	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	Key's	X	X	
	Ch's	X	X	
Pitch Bender		X	X	
Control		O 70 - 87	O 70 - 87	see add. Table
Progr.		O (0-49)	O (0-49)	
Change	True #	1-50	1-50	
System Exclusive		X	X	
System	Song Pos	X	X	
Common	Song Sel	X	X	
	Tune	X	X	
System	Clock	X	X	
Realtime	Commands	X	X	
	Local ON/OFF	X	X	
Aux	All notes OFF	X	X	
Messages	Active Sense	X	X	
	Reset	X	X	
Notes				

O = YES, X= NO
Mode 1: OMNI ON, POLY
Mode 2: OMNI ON, MONO
Mode 3: OMNI OFF, POLY
Mode 4: OMNI OFF, MONO

Tab. 4.1: MIDI implementation chart

Parameter Name	Display Range	Midi Control Number	Control Value Range
Max. Out Level	-48 .. 0	70	0 .. 48
RMS Mode		71	0 = Peak , 1 = RMS
Stereo Width	0 .. 100	72	0 .. 100
Ultramizer Density	0 .. 100	73	0 .. 100
Ultramizer Speed	1 .. 100	74	0 .. 99
Ultramizer Range	0 .. 24	75	0 .. 24
Denoiser Threshold	OF, -90 .. 0	76	0 .. 91
Denoiser Sensitivity	0..100	77	0 .. 100
Left / Right	-	78	0 = coupled, 1 = L, 2 = R
Exciter Process	0 .. 100	79	0 .. 100
Exciter Tune	4 .. 11	80	0 .. 100
Super Bass Process	0 .. 100	81	0 .. 100
Super Bass Tune	50 .. 150	82	0 .. 100
Crossover	20 (Hz) .. 20 (kHz)	83	0 .. 30
Low Mute	-	84	0 = On, 1 = Mute
High Mute	-	85	0 = On, 1 = Mute
Store	-	86	0 .. 49
In / Out	-	87	0 = Out, 1 = In

Tab. 4.2: Controller functions with MIDI

4.2 Specifications

Analog Inputs

Connectors	XLR and 1/4" jack
Type	RF filtered, servo balanced input
Impedance	40 kOhms balanced, 20 kOhms unbalanced
Nominal Operating Level	-20dB to +4dB
Max. Input Level	+16 dB at +4 dB nominal level, +2 dB at -20 dB nominal level

Analog Outputs

Connectors	XLR and 1/4" jack
Type	Electronically servo-balanced output stage
Impedance	66 Ohms balanced, 33 Ohms unbalanced
Max. Output Level	+16 dB at +4 dB nominal level, +2 dB at -20 dB nominal level

System specifications

Bandwidth	20 Hz to 20 kHz, -1 dB
S/N	>95 dB, A weighted, 20 Hz to 20 kHz
THD	0.0065 % typ.+4dB, 1 kHz, Gain 1
Crosstalk	<-95 dB, 22 Hz to 22 kHz

MIDI Interface

Type	5-Pin-DIN-Socket IN / OUT / THRU
Implementation	Refer to MIDI Implementation Chart in Chapter 5.1

Digital Processing

Converters	24-bit Sigma-Delta, 64/128-times Oversampling
Sampling Rate	48 kHz

Display

Type	$2_{1/2}$ -digit numeric LED-Display

Power Supply

	AC 100-120 V 50/60Hz
	AC 220-240 V 50/60Hz
Fuse	100-120 V AC: 250 mA(slow-blow)
	220-240 V AC: 125 mA (slow-blow)
Power Consumption	10 Watts
Mains Connection	Standard IEC receptacle

Physical

Dimensions(H * W * D)	45mm X 482mm X152mm
Net Weight	2 kg
Shipping Weight	3 kg

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