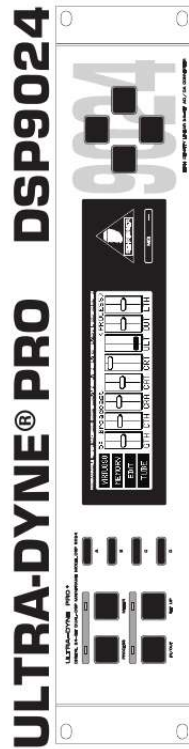




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You can read the recommendations in the user guide, the technical guide or the installation guide for BEHRINGER DSP9024. You'll find the answers to all your questions on the BEHRINGER DSP9024 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual BEHRINGER DSP9024
User guide BEHRINGER DSP9024
Operating instructions BEHRINGER DSP9024
Instructions for use BEHRINGER DSP9024
Instruction manual BEHRINGER DSP9024



User's Manual

Version 1.1 December 2001

ENGLISH



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Manual abstract:

DETAILED SAFETY INSTRUCTIONS: All the safety and operation instructions should be read before the appliance is operated. Retain Instructions: The safety and operating instructions should be retained for future reference. Heed Warnings: All warnings on the appliance and in the operating instructions should be adhered to. Follow instructions: All operation and user instructions should be followed. Water and Moisture: The appliance should not be used near water (e.g. near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool etc.). Ventilation: The appliance should be situated so that its location or position does not interfere with its proper 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 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 qualifield service personnel.

2 ULTRA-DYNE PRO DSP9024 FOREWORD Dear Customer, Welcome to the team of ULTRA-DYNE PRO users and thank you very much for expressing your confidence in BEHRINGER products by purchasing this unit. It is one of my most pleasant tasks to write this preface for you, because it is the culmination of many months of hard work on the part of our engineering team to reach a very ambitious goal: to present an outstanding device, which due to its flexibility is suitable for deployment in studios and PA rental companies, as well as discotheques and clubs. The task of developing our new ULTRA-DYNE PRO 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 always 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 they've achieved. It is our philosophy to share our joy with you, because you are the most important member of our team. You've contributed greatly to shaping our company and making it successful with your highly competent suggestions for new products. In return, we guarantee you uncompromising quality (manufactured under an ISO9000 certified management system) as well as excellent technical and audio properties at an extremely favorable price. All of this will enable you to fully unfold your creativity without being hampered by budget constraints.

We are often asked how we can produce such high-grade devices at such unbelievably low prices. The answer is quite simple: it's you, our customers! Many satisfied customers means high sales volumes, enabling us to get better terms of purchase for components, etc. Isn't it only fair to pass this benefit back to you? We know that your success is our success, too! I would like to thank everyone whose help on the ULTRA-DYNE PRO project made it all possible. Everyone involved made very personal contributions, starting from the designers of the unit, to the many staff members in our company, to you, the user of BEHRINGER products. My friends, it's been worth the effort! Thank you very much, Uli Behringer 3 ULTRA-DYNE PRO DSP9024 ULTRA-DYNE PRO Ultra-high performance Digital Stereo Mainframe powered by two 24-bit High-Speed Signal Processor High-end 24-bit AD/DA converters for ultra-high dynamic range and resolution of detail with selectable Sampling Rate of 44.1 or 48 kHz Ultimate 6-way Multiband Dynamics Processor for analog and digital Mastering and Sound Reinforcement systems 6-Band Compressor with separate Peak Limiter section for "inaudible" compression. No side-effects, such as "bass pumping" etc. 6-Band Gate with adjustable threshold, hold time, release time and peak width ULTRAMIZER® automatically adjusts output level and signal density for maximum perceived loudness VIRTUOSO® function for super-easy, program-dependent and self-learning program setup 3-Band Harmonics Exciter with user-definable balance for odd / even harmonics and unique "kick" control Extremely sophisticated Tube emulation with selectable tube types (12AX7, 12AY7, EL34, EL84) for ultrawarm sound Internal 600 msec. Delay enables a "Look Ahead" for intelligent, anticipating processor function Ultra-accurate Level Peak Meter with Peak Hold and selectable Reference Levels (+4 dBu / -10 dBV / Dig Max) Full MIDI parameter and snapshot control allow for real time editing Free ULTRA-DYNE software allows for total remote control via PC (download at www.behringer.com) Extremely versatile presets give you outstanding and instant sound results for numerous standard applications 100 settings can be stored under any alphabetic name. Memory backed up by a long life battery Security Key Password can be installed for programs or unattended use Open-ended and "future-proof" architecture allows for future software upgrades Extremely flexible Stereo Link, Band Link & Clone functions 24-bit AES/EBU Interface for Digital inputs and outputs at 32, 44.1 and 48 kHz (optional) Large high-resolution LCD Graphic Display with high-contrast LED backlight Servo-balanced inputs and outputs on gold-plated XLR and jack connectors for high signal integrity Relay-controlled hard bypass with an auto bypass function during power failure (fail-safe relay) High-quality components and exceptionally rugged construction ensure long life and durability Internal power supply design for professional applications Manufactured under ISO9000 certified management system 4 DSP9024 ULTRA-DYNE PRO DSP9024 TABLE OF CONTENTS 1.



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As standard, the BEHRINGER ULTRA-DYNE PRO is installed with electronically servo-balanced inputs and outputs. The circuit design features automatic hum rejection for balanced signals, permitting trouble-free operation even at the highest operating levels. Externally induced power-line hum, etc. is thus suppressed effectively. The automatic servo function recognizes the presence of unbalanced connectors and adjusts the nominal level internally to avoid level differences between the input and output signals (6 dB correction). The optional digital input and output (AES/EBU interface) connections are balanced with a negative ground.

Highquality connectors ensure isolated, noise-free signal throughput. The MIDI connections (IN/OUT/THRU) have been realized with standardized DIN plug-in connectors. Optocouplers have been used for isolated data communications. 1.3 Control elements Fig.

1.1: The ULTRA-DYNE PRO front panel The front panel of the ULTRA-DYNE PRO is equipped with four mode keys, four softkeys, four cursor keys and a MIDI monitor LED. Status information is displayed on the backlit 240 x 64 panel. Fig. 1.

2: The front panel controls 1 8 Press the PROCESS key to quickly and conveniently access all of the unit's major program functions via virtual faders. 1. INTRODUCTION ULTRA-DYNE PRO DSP9024 This permits you to call up, save and edit programs with ease. The ULTRA-DYNE PRO's factory presets are a solid foundation for a variety of applications. The automatic VIRTUOSO and ULTRAMIZER functions permit the convenient customization of these applications to suit your audio material. The first setup level provides global access to the parameters of all bands simultaneously, while the second permits the manual adjustment of band-specific controls. Here you will also find a screen for access to the Tube and Exciter functions. 2 Press the METER key for a multiple level display with the levels of the individual bands, as well as those of the input and output signals. In addition, the respective level differences to the original signal are also displayed. The last fader used remains active when switching from the PROCESS to the METER operating mode.

The parameter in question may still be modified using the vertical cursor keys while monitoring changes to the signal processing on the corresponding display. 3 Press the IN/OUT key to include the ULTRA-DYNE PRO in the signal path (green LED) or switch to bypass mode (LED is dark). The LED flickering red indicates DSP overflow. This does not necessarily mean "clipping". Flickering starts as soon as an internal processing overflow occurs, while input and output levels may be OK. When this LED lights up often, reduce the input level. Press the SETUP key to access the setup levels which permit the individual numerical editing of each parameter. Pressing the SETUP key briefly accesses the first setup level in which the complete range of values for all available ULTRA-DYNE PRO parameters can be edited (see Chapter 2.1.4).

Holding the SETUP key for about two seconds switches to the second SETUP level. Here all the basic settings of the device can be found, such as the choice of input source, sample rate, password protection, MIDI configuration etc. 4 5 Four SOFTKEYS marked A, B, C and D are arranged vertically to the left of the display. The functions of these keys are defined by the user software and are indicated by a pictogram or text to the right of each key in the display. Each pictogram and its associated functions will be explained in detail in Chapter 2.

Central in the control of the ULTRA-DYNE PRO is the LED-backlit 240 x 64 DISPLAY. The MIDI LED which displays the input of MIDI data is located to the right of the display. The CURSOR KEYS are also positioned to the right of the display. These keys can be used for the selection (horizontal) and operation (vertical) of the faders shown on the display, as well as the selection of parameter fields in the SETUP menu. In each case if you hold the key being used and then press the opposite key you will accelerate whatever operation you are undertaking.

6 7 8 Fig. 1.3: The back panel layout of the ULTRA-DYNE PRO 9 FUSE HOLDER / VOLTAGE SELECTOR. Before connecting the unit to AC power, ensure that the operating voltage is set to your local AC voltage. Always use replacement fuses of the same type. In some units, the fuse holder can be inserted in two positions to switch between 220 - 240 V and 100 120 V. Please note that a higher fuse rating must be used when operating the unit outside of Europe with 115 V (See the INSTALLATION chapter). 1. INTRODUCTION 9 ULTRA-DYNE PRO DSP9024 10 11 Use the POWER switch to activate your ULTRA-DYNE PRO. AC POWER CONNECTION.

Use only the included AC cable to connect the unit to your AC power supply. Please also ensure that your AC power socket has a ground. This ground conductor must NOT be disabled to prevent hum pick-up. If you experience AC hum problems, use a DI box such as the BEHRINGER ULTRA-DI to preserve the protective function. ANALOG INPUTS. The ULTRA-DYNE PRO has balanced XLR and jack connector inputs designed for maximum levels of +22 dBu. Microphone signals thus require pre-amplification, e.g. via a mixer. ANALOG OUTPUTS.

The analog outputs of the ULTRA-DYNE PRO have also been realized as balanced XLR and jack connectors. A maximum output level of +16 dBu is available at the internal digital maximum (DIGIMAX). AES/EBU INPUTS (optional). An optionally available female XLR digital interface can be installed here. AES/EBU OUTPUTS (optional).

The optional male XLR digital interface output can be installed here. The AES/EBU option transfers 24-bit data words at 32, 44.1 or 48 kHz. MIDI IN, OUT and THRU. These connectors permit the MIDI remote control of the ULTRA-DYNE PRO.

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. You may also use our online registration option available on the Internet at www.behringer.com. 12 13 14 15 16 17 2. OPERATION 2.1 The ULTRA-DYNE PRO operating concept The complex nature of the parameter settings required the development of a new operating concept for the ULTRA-DYNE PRO. This permits quick, simple editing of the key parameters, as well as the fine optimization of each of the individual parameters to suit the program material. The operation of the ULTRA-DYNE PRO can be broken down into four different levels: 1.

The programming level, with the selection and editing of presets. 2. The editing level, which permits the convenient optimization of nearly all available parameters. 3. The METER menu, which in addition to its graphical display of levels also permits editing. 4. The SETUP menu, which provides access to all of the global and band-specific parameters for the six frequency bands on several text pages. 2.1.1 The program level The ULTRA-DYNE PRO has over 100 program memory locations, some of which contain factory-preset programs.



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These programs contain a large number of basic settings to cover a wide variety of applications. These programs can be called up very quickly and generally provide good results in practice. Of course, user-defined settings can be saved as required and recalled at a later time. 2.1.

2 The editing level Use the editing level to modify the preset programs to suit the program material. The editing window contains eight faders which can be used to optimize these programs. Please note that the faders do not represent absolute levels, but parameter changes relative to the presets, with the adjustment limited to a suitable range. These limits only apply to the factory presets and to programs based on the preset programs. 2.

1.3 The meter level The input and output levels of the six individual bands is displayed in the meter level. It also permits the editing of parameters while monitoring the effects of the changes on the meters. 10 2. OPERATION ULTRA-DYNE PRO DSP9024 2.1.4 The setup level The full range of all available ULTRA-DYNE PRO parameters can be edited on the setup level. The results can range from "interesting" to "surprising" to "brilliant". Completely new applications can also be created. The setup level is thus the domain of experts and those with a passion for experimentation.

The programs and parameters of the editing level can be accessed by pressing the PROCESS key. 2.2 PROCESS mode The ULTRA-DYNE PRO is in PROCESS mode immediately after being switched on. Fig. 2.1: <PROCESS> menu Use this mode to call up the <MEMORY> menu for loading and saving programs. It also provides direct access to the main parameters of the individual ULTRA-DYNE PRO functions. The VIRTUOSO function can also be called up directly from the <PROCESS> menu. ULTRA-DYNE PRO uses this function to analyze the program material and automatically set the Compressor parameters. An information window appears with the exact designation and value of the selected parameter when using a fader.

The softkey C (EDIT) takes you to the band-specific editing level which permits the individual editing of the Gate and Compressor values for all six bands.

The softkey D (TUBE) provides access to the Tube Simulation and Exciter parameters. 2.2.1 Editing parameters Please refer to Table 2.

1 for the structure of the parameters and the meanings of the abbreviations. Display GTH CTH CRA CAT CRT ULT OUT LTH Function Gate Parameter Threshold Threshold Ratio Attack Time Release Time Process Gain Threshold Range -90 to -40 dB, OFF -70 to 0 dB, OFF 1:1 to 88:1, INF:0 0 to 250 ms 0.05 to 5 s 0 to 100 -24 to +24 dB -36 to 0 dB, OFF Default Value OFF OFF 1:1 0 ms 5s 0 0 dB 0 dB Compressor Ultramizer Outgain Limiter Tab. 2.1:

Fader functions in PROCESS mode The first five parameters in the <PROCESS> menu are contained in all six bands.

The last three entries pertain to the complete frequency range, however. Please see chapters 2.4.1 and 2.4.2 for the definitions of the parameters. Parameters edited in the <PROCESS> menu have a global effect on all six bands. 2.2.2 Program administration A program stores all of the parameter settings affecting the signal.

Global hardware settings such as the configuration of the inputs and MIDI interface, i.e. the setup level 2 settings, are not stored in the respective programs. The ULTRA-DYNE PRO has over 100 program memory locations that contain the factory presets, as well as room for your own creations. 2. OPERATION 11 ULTRA-DYNE PRO DSP9024 Fig. 2.2: <MEMORY> menu Press the softkey B (Memory) in the <PROCESS> menu to access the <MEMORY> menu. The Up and Down cursor keys can be used to select and listen to programs in this menu. An information window displaying the selected program appears as soon as you press one of the cursor keys.

At the same time, the displayed preset is automatically played. Use softkey D (A/B) to compare it with the program you have been editing. The currently active program is indicated by a bold letter in the pictogram: A is the edited version, while B is the selected program. To load the program, press softkey A (LOAD) and follow the instructions in Chapter 2.2.

3. Softkey C (CLEAR) clears your current program from the memory and permits the selection of a default preset. The message "CLEAR WORKSPACE" is displayed when the softkey C (CLEAR) is pressed. Confirm the query with "OK" to reset all current parameters to their defaults. Be sure to save the edited program first if desired.

2.2.3 Loading a program Fig. 2.3: <LOAD> menu Press the softkey A (Load) in the <PROCESS> menu to access the <LOAD> menu. The same information window is displayed in the fader area as when operating a fader. Use the Up and Down cursor keys to select a program and listen to it with the softkey D (LISTEN). The listening function is indicated by a highlighted "LISTEN" in the pictogram. Next, select the desired program with softkey A (OK) or return to the <PROCESS> menu with softkey B (CANCEL). 2.

2.4 Saving programs Fig. 2.4: <STORE> menu Use the softkey B to access the <STORE> menu. This also displays an information window in which you can select a program location to save your own creation using the Up and Down cursor keys. Use softkey A (OK) to assign a name to the program or softkey B (CANCEL) to cancel the save operation and return to the <PROCESS> menu. If a program location is already occupied, the warning OVERWRITE PROGRAM? will appear. Press softkey A (OK) again to assign a name to your program. A window with a character map will now appear in the display.

Choose the character you require with the cursor keys and it will appear at the flashing cursor in the name field.

Use the softkeys B and C to move the cursor in the name field. Softkey D (CLEAR) deletes any characters which may have already been entered. Program names can have a maximum of 12 characters. Once the name is complete, press softkey A (OK) to return to the <PROCESS> menu. 12 2.

OPERATION ULTRA-DYNE PRO DSP9024 2.2.5 Activating VIRTUOSO The VIRTUOSO function can reduce your setup work considerably by analyzing your audio material and automatically determining the compression values. Press the softkey A in the <PROCESS> or <METER> menus to access the VIRTUOSO function. This brings you to the <VIRTUOSO> menu in which you can select the required degree of compression using the four softkeys.

Fig. 2.5: <VIRTUOSO> menu The ULTRA-DYNE PRO now analyzes the audio material until you end the analysis with softkey C (OK) or cancel it with softkey D (CANCEL). The analysis is indicated by the flashing VIRTUOSO pictogram. Fig. 2.6: VIRTUOSO analysis window Next, the ULTRA-DYNE PRO automatically sets the Threshold parameters of all six Compressors for the individual bands to suit the audio material, ensuring optimal compression (see Chapter 3.4, VIRTUOSO function). The compression can also be corrected subsequently by changing the INGAIN parameter in the setup menu.



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If the compression is too powerful, reduce the INGAIN value and vice versa.

2.2.6 Band-specific editing Fig. 2.7: <EDIT> menu Press the softkey C (EDIT) in the <PROCESS> menu to access the <EDIT> menu, which permits bandspecific editing via the faders. Select one of the six bands with softkey B. The pictogram shows the currently selected band. Pressing the key once more will switch to the next higher band. The first six parameters (1 Gate, 4 Compressor, 1 Outgain) are available for each band, whereas the last two (1 Ultramizer, 1 Limiter) apply to the entire frequency range. BANDLINK must be OFF to change settings per band.

Softkey D (A/B) allows you to compare the current setting with the settings of the program as it was loaded. The B in the pictogram is displayed in bold whenever you modify a loaded program. If you are not satisfied with the new setting, you can return to the original program by pressing softkey D a second time and trying a new setting from there. As soon as you change a value, the B in the pictogram will once again be displayed in bold. Upon loading a new program, neither A nor B will be highlighted as long as no changes have been made.

2. OPERATION 13 ULTRA-DYNE PRO DSP9024 Use the softkey A (CLONE) to copy the parameters of the selected frequency band to any or all other frequency bands of the given channel. The settings are also copied to all bands of the other channel when in stereo mode (setup level 2). The message "COPY BAND X TO ALL BANDS" will be displayed. Use the Up and Down cursor keys to select whether the parameters of the current band should be copied to all other bands (ALL BANDS) or to a specific band (BAND X).

2.2.7 Tube Simulation Press the softkey D (TUBE) in the <PROCESS> menu to access the <TUBE> menu. Fig. 2.8: <TUBE> menu Use this menu to set up the Exciter and Tube Simulation. Please refer to Table 2.2 for the structure and the meanings of the abbreviations. Softkey D (A/B) allows you to compare the current setting with the settings of the program as it was loaded. The B in the pictogram is displayed in bold whenever you modify a loaded program.

If you are not satisfied with the new setting, you can return to the original program by pressing softkey D a second time and trying a new setting from there. As soon as you change a value, the B in the pictogram will once again be displayed in bold. Upon loading a new program, neither A nor B will be highlighted as long as no changes have been made. Display EXC O/E PRC TYP Function Exciter Exciter Tube Tube Parameter Process Odd/Even Process Type Range 0 to 100 1/19 to 19/1 0 to 100 12AX7, 12AY7, EL34, EL84 Default Value 0 10/10 0 12AX7 Tab. 2.2: Fader functions in the <TUBE> menu 2.3 METER mode Press the Meter key to enter the METER mode. Fig. 2.9: METER mode This mode displays the input and output levels of all frequency bands (ascending from left to right) and the overall levels of the two channels.

Information is also shown regarding level changes made by the ULTRADYNE PRO. Gain reductions are displayed as a small bar extending downward from the 0 dB mark. It is possible to activate the VIRTUOSO mode while in METER mode by pressing softkey A (see 3.4). Softkey D toggles between the display of the input and output levels.

IN or OUT are highlighted accordingly. 14 2. OPERATION ULTRA-DYNE PRO DSP9024 2.3.1 Advanced level meter Press the softkey B (SINGLE) to call up the advanced level meter.

Fig. 2.10: Advanced level meter You can use the advanced level meter to control the input and output levels of the ULTRA-DYNE PRO. The bar graph displays the effective RMS level (solid parts of the bars), and the peak level (checkered tips of the bars) simultaneously. To save your eyes, the release time of the peak display is 20 dB/s. Use softkey A (CLEAR) to erase the maximum levels from the memory. Softkey B switches between the display of the individual bands (BAND 1 to 6) and the master channel (MASTER). The current selection is shown in the pictogram. Softkey D (IN/OUT) toggles the display between the input and output levels. Peak Limiter activity is indicated by the "LIM" in the display.

Use softkey C to choose between three different tables of reference levels. The reference levels are shown with a bold mark on the scale, and the numerical display changes simultaneously. DIGMAX refers to the digital maximum. This level must not be exceeded under any circumstances. This will result in a very noticeable form of distortion, which occurs much faster and sounds very much more unpleasant than the familiar distortion associated with analog devices.

+4 dBu refers to the operating level found in professional audio equipment (analog inputs and outputs of the ULTRA-DYNE PRO). -10 dBV refers to the operating level found in home recording and domestic audio equipment, a typical example being tape recorders with unbalanced RCA connectors. When setting the ULTRA-DYNE PRO's internal level, or when using the optional AES/EBU interface, the peak level display of the DIGMAX scale is the ONLY one to use. The +4dBu and -10dBV scales serve to monitor the analog inputs and outputs of the ULTRA-DYNE PRO. Please note that the RMS level will usually be quoted in the technical specifications of analog devices, such as for the input sensitivity of power amplifiers.

The RMS level will always be lower than the peak level. The difference is dependent upon the signal structure. For a static sine wave, the RMS level is about 71% of the peak level, a difference of 3 dB. The DIGMAX level is, of course, related to the analog input and output levels, as 0 dB DIGMAX corresponds to the maximum output level of the ULTRA-DYNE PRO. The following example, using a sine wave at maximum amplitude, clearly illustrates the relationship between the various scales: Scale DIGMAX +4 dBu -10 dBV Absolute value: Maximum level RMS -3 dB +9 dB +21 dB +16 dBu PEAK 0 dB +12 dB +24 dB Tab.

2.3: Relationship between display and output level As can be seen from the above table, the ULTRA-DYNE PRO's maximum analog output level is +16 dBu.

The ULTRA-DYNE PRO's analog input can handle a maximum of +22 dBu. 2. OPERATION 15 ULTRA-DYNE PRO DSP9024 2.

3.2 Editing in METER mode Press the softkey D to access the <EDIT> menu in METER mode. This menu can also be opened by pressing any cursor key. Fig. 2.11: <EDIT> menu in METER mode The eight parameters in the <PROCESS> menu can be edited while visually monitoring the effects of the edits on the level meters. Softkey D (IN/OUT) toggles the display between the input and output levels. Your selection is indicated by a highlighted "IN" or "OUT" in the pictogram. Use the softkeys A and B to select the parameter to be edited. The Left and Right cursor keys can be used to switch between the individual bands (1 to 6), as well as to change between the left and right channels when in 2-channel mode.

Use the Up and Down cursor keys to edit the selected parameter.



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Sofitkey C (SOLO) lets you listen to the current band being affected by the selected parameter separately. The meter also displays only the selected band while in solo mode. The other displays are disabled while the solo mode is active. 2.4 Setup level 1 Press the SETUP key to access setup level 1. The LED above the SETUP button will start to flash. This level contains all of the settings which are related to the actual signal processing. Pressing the SETUP key will take you to the input/output menu <IN/OUT> and the band menus (BAND 1 to 6). The "LEFT" and "RIGHT" entries in the first line let you switch between the left and right channels.

If stereo mode is activated in setup level 2, this display will not be present, i.e. both channels are linked and will be edited at the same time. The parameters are selected using the cursor keys in all setup menus. Parameters can be modified and modes switched using the softkeys marked "+" and "-".

The two outer softkeys can be used to make modifications over a wider range than the inner ones. In each case, pressing the opposite key while holding the key being used will accelerate the operation being carried out. Pressing the PROCESS or METER keys will cause the unit to exit from either setup level. All of the SETUP settings are stored when switching off the ULTRA-DYNE PRO and remain unchanged until the next time you edit them. 2.

4.1 Input/output menu Fig. 2.12: <IN/OUT> menu in setup level 1 This window is split vertically, with the parameters related to the input on the left and the output on the right. The input side: LEFT/RIGHT The selected channel is displayed here. The channels can be toggled with the Plus or Minus softkeys.

INGAIN The input gain can be adjusted in 1 dB increments from -24 to +24 dB. 16 2. OPERATION ULTRA-DYNE PRO DSP9024 TUBE TYPE Four different Tube Types are available for the Tube Emulation: 12AX7, 12AY7, EL34 and EL84. TUBE PROCESS The Tube Process value determines the degree of tube-type distortion to be added to the signal.

The value range is 0 to 100. EXCITER PROCESS The addition of harmonics by the Exciter can be set in a range from 0 to 100. ODD/EVEN Determines the Ratio of Even to Odd harmonics in the Exciter. This may be varied from 1/19 to 19/1. The output side: OUTGAIN The Output Gain can be adjusted in 1 dB increments from -47 to +24 dB. ULTRAMIZER PROCESS This function is a special feature of the ULTRA-DYNE PRO which continuously and automatically optimizes the Input Gain and Compressor Thresholds to the program material. This parameter determines the degree to which this automatic function affects the dynamic control. The values for ULTRAMIZER PROCESS range from 1 to 100. ULTRAMIZER THRESHOLD Determines the Ultramizer's range of application. The Ultramizer function does not become active if the input signal does not have to be raised beyond the value set here.

The range can be set between 0 and 24 dB. PEAK LIMIT A Peak Limiter with a user-definable Threshold of -70 to +0 dB can be applied to the overall signal. OFF disables the Gate Threshold. LIMITER RELEASE Set the Release time of the Peak Limiter here. The Release time is the time constant after which the attenuation is released once the signal has dropped below the Threshold.

Values in the full second range are generally used. The range can be set between 0.5 and 5 seconds. 2.4.

2 Band menu Fig. 2.13: <BAND> menu in setup level 1 The BAND X parameter for the selection of individual bands may be found in the top left corner of the band menu. The LEFT/RIGHT toggle field for the channel is just to the right. This field is not activated in stereo mode (setup level 2). The ULTRA-DYNE PRO automatically goes to the SETUP window for the band last selected when switching from PROCESS mode to SETUP. The cursor will also reappear at the last selected parameter. LO FRQ Sets the Lower limit Frequency for the band. HI FRQ This parameter determines the Upper limit Frequency for the band. In the case of neighboring bands, the upper limit frequency of the lower band is always identical with the lower limit frequency of the next higher band.

In other words, changing one value automatically adjusts the related value as required. 2. OPERATION 17 ULTRA-DYNE PRO DSP9024 GATE THRESHOLD Determines the Threshold for the Noise Gate in this band, with a Threshold value between -96 dB and -25 dB. OFF disables the Gate Threshold. GATE HOLD This parameter sets the waiting time before the noise Gate release process starts. GATE RELEASE The GATE RELEASE parameter determines the time which the noise Gate requires to return to 1:1. The GATE HOLD and RELEASE times can be set from 20 to 720 ms in 20 ms increments. PEAK WIDTH This parameter determines the Width of peaks to be ignored by the Gate. The valid time range for this setting is 0 to 150 ms. This can be used to specifically suppress clicks.

EXCITER DRIVE This parameter determines the Exciter Effect control for the three upper bands (4 to 6). The intensity of the Exciter can be set using the Exciter process parameter in the <TUBE> and <IN/OUT> menus. This parameter can be adjusted from 0 to 100. COMPRESSOR THRESHOLD The Threshold for the Compressor can be set from -70 dB to 0 dB. OFF disables the Compressor Threshold.

COMPRESSOR RATIO The Compression Ratio can be set from 1:1 (no compression) to INF:0 (INF = infinite). INF:1 corresponds to the action of a limiter. COMP. ATT. The Compressor Attack time is the time in which the Compressor regulates the signal to the set Ratio after the Threshold has been exceeded.

COMP. REL. The Compressor Release time is the time in which the Compressor returns the signal to 1:1 after the level has dropped below the Threshold. KNEE The Knee parameter determines whether the compression should become effective abruptly (hard), or gently and gradually before reaching the actual Threshold value (soft). A total of 36 increments are also available for this parameter. Factory default is value 18. 2.5 Setup level 2 Hold the SETUP key for about 2 seconds to enter setup level 2. This level contains all of the global unit settings such as memory management and the configuration of the MIDI interface. At this level, the LED above the SETUP key remains continuously lit.

Use the SETUP key to switch between the <GLOBAL SETUP> and <MIDI SETUP> menus. The setup level 2 settings are saved globally and do not affect the program memory. 2.5.1 Global setup Fig. 2.14: <GLOBAL SETUP> menu in setup level 2 18 2. OPERATION ULTRA-DYNE PRO DSP9024 INPUT The input field is used to determine whether the input signal should be derived from the optional digital input, or from the analog input. In addition, the sampling frequency is set here for analog operation. The available frequencies are 32 kHz / 44.

1 kHz and 48 kHz (the digital input automatically synchronizes to these frequencies). When changing sample rates, the ULTRA-DYNE PRO will be muted briefly. In purely analog mode the 48 kHz rate should be used.



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Apart from the fact that the high sample rate gives the widest frequency response and correspondingly the best possible sound, the fastest signal processing takes place at this rate. If the ULTRA-DYNE PRO unexpectedly doesn't output a signal, this may be due to an incorrect input configuration.

VIEWING ANGLE Viewing Angle controls the contrast adjustment for the display in increments from 0 to 31. **MODE** The two channels of the ULTRA-DYNE PRO can be stereo-linked using this parameter. This automatically copies all settings to the opposite channel. The channels are also linked in such a manner that both are edited simultaneously. Both channels operate completely independently in 2 CHANNEL mode.

DELAY The ULTRA-DYNE PRO has an integrated memory for the delay and intermediate storage of the input signal. This permits the optimal adaptation of the control processes, as the signal can already be analyzed before processing. Delay times of 20 to 40 ms ensure optimal compression characteristics with your ULTRA-DYNE PRO. The delay time may be set from 0 to 600 ms. Factory default is 10 ms. This signal delay can easily cause unpleasant side effects in live applications, making it advisable to keep the delay time as short as possible.

SECURITY The SECURITY function offers effective protection against unauthorized manipulation of the ULTRA-DYNE PRO. **UNLOCK** means that all functions may be accessed, with the exception of programs that are secured under **PROTECT MEMORY**. **LOCK** prevents any of the parameters on the device being accessed, the only exceptions being the **DISPLAY** of the present setting, plus the input and output level with the **LEVEL METER**. The only other way to access the parameters is via **MIDI**.

To use the SECURITY function, enter a **PASSWORD** with the cursor keys and softkeys. The softkeys are used to select the letter or symbol to be used, and have the following functions: Softkey A confirms entry of the password and immediately activates the **LOCK** status. Softkeys B and C move the cursor left and right within the **PASSWORD**. Softkey D erases any characters which may have already been entered. The **LOCK** status can be cleared by calling up **SETUP** menu again. The relevant **PASSWORD** field is displayed immediately, and the **PASSWORD** may be re-entered. This returns the ULTRA-DYNE PRO to **UNLOCK** status. If the device is locked without entering the **PASSWORD**, simply enter **OK** to **UNLOCK**. Do not forget the password! If this happens, there is only one way to remove it: Open the casing of the ULTRA-DYNE PRO and take the battery out for a short while. After replacing it and switching the unit on, the original factory presets will be reloaded.

We recommend that this should only be performed by an experienced engineer to avoid inadvertent damage to the unit. Warning! Doing this will cause you to lose all your programs, AND void the warranty!

PROTECT MEM The **PROTECT MEMORY** parameter switches the write protection for the program memory on and off. **LOW** and **HIGH** The functions **LOW** and **HIGH** determine the area of program memory which will be protected by the **PROTECT MEMORY** function. **LOW** determines the lowest, **HIGH** the highest program number of the protected area. The **PROTECT MEMORY** function can be disabled with **OFF** (also see Security).

2. OPERATION 19 ULTRA-DYNE PRO DSP9024 2.5.2 MIDI setup Fig. 2.

16: <**MIDI SETUP**> menu in setup level 2 **MIDI ON** = **MIDI** interface enabled, **OFF** = **MIDI** interface disabled. **CHANNEL** Sets the **MIDI** send and receive channels; the channels 1-16 may be selected. **SND MEMORY DUMP** and **RCV MEMORY DUMP** The complete contents of the ULTRA-DYNE PRO memory can be transferred via **MIDI** to another ULTRA-DYNE PRO or a PC (**SEND MEMORY DUMP**). Conversely, the contents of the memory can also be received via **MIDI** (**RECEIVE MEMORY DUMP**). The transmission or readiness to receive is activated in both cases by simultaneously pressing one Plus and one Minus key each. **OMNI MODE** With the **OMNI MODE** enabled, the ULTRA-DYNE PRO can receive data on all **MIDI** channels. This may prove useful to test the unit's response to incoming **MIDI** commands or in cases in which you are unsure of the **MIDI** channel being used for the transmission. **CNTL**, **PROG** and **EXCL** These fields can be used to additionally enable the Sending (**SND**) and Receiving (**RCV**) of controller data (**CNTL**), Program Change commands (**PROG**) and System Exclusive data (**EXCL**). Caution: Receiving a memory dump will overwrite the existing programs!

3. APPLICATIONS

This section will cover a number of typical applications for the BEHRINGER ULTRA-DYNE PRO.

Most problems related to dynamics can be solved using the following basic settings. Please take the time to study the following sample applications in detail in order to ensure the optimum deployment of the unit's broad range of features. Primary applications and basic settings Generally speaking, BEHRINGER ULTRA-DYNE PRO applications can be broken down into seven areas: 1. The **GATE** section removes noise and suppresses crosstalk in multi-channel operation. 2. The **COMPRESSOR** section increases the density of the program material and can be used to create special effects and sounds frequently encountered in the recording and music fields. 3. The **VIRTUOSO** function ensures compression suited to your requirements and adapted to the characteristics of the program material. 4. The **ULTRAMIZER** function automatically adjusts the input gain and Compressor parameters to suit your program material.

5. The **PEAK LIMITER** section is designed to protect speaker systems, tape machines, transmission lines, etc. from overload. 6. The **TUBE** simulation adds additional harmonics to the audio signal for a lively, warm character.

7. The EXCITER function is designed to enhance the audio quality after compression. 20 3. APPLICATIONS ULTRA-DYNE PRO DSP9024 3.1

Compression/Leveling/Limiting/Clipping After describing the the individual sections in detail, we would now like to acquaint you with further important concepts pertaining to the processing of dynamics: **Compression** A compressor reduces a broad dynamic range to a limited dynamic band. The resulting dynamic range depends on the threshold, attack, release and ratio settings. As the desirable effects of a compressor include the boosting of low-level signals, the threshold value is generally set low. "Inaudible" compression requires fast attack and release times and low compression rates. Faster attack and release times and higher compression rates increase the effect on short-term dynamics. This may be put to use to achieve audible, creative sound effects, for example. **Leveling** The leveling function is used to keep the output level constant, i.e. to compensate for long-term changes in the input level without restricting short-term dynamics. The threshold is generally set low to ensure that low-level signals will be boosted. The leveling function uses slow attack and release times in conjunction with a high ratio.

Due to its very long attack times, leveling does not affect signal peaks or short-term changes of the average level.



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Limiting The limiting function uses short attack times, a high compression ratio and a release time which depends on the given application and the desired audio effect. The threshold must be set high, as a limiter is only used to set a ceiling for high signal levels. The degree of dynamic range reduction depends on the ratio setting and the extent to which the threshold is exceeded. A so-called program limiter uses attack times greater than 20 ms and is designed to control the average level. Short-term signal peaks exceeding the set threshold value can also pass the limiter in this case. Peak limiters use attack times set to less than 5 ms to control signal peaks as well. Clipping Unlike the two previous limiter types, the clipping function is characterized by the use of instantaneous attack and release, as well as infinite compression rates to ensure absolute limiting for all signals above the set threshold ("brickwall" limiting). Clipping has the effect of a radical cutoff of signal peaks exceeding the threshold without restricting the amplitude of the actual signal form. Under normal circumstances, the clipping function is inaudible and may even result in improved audio quality under certain circumstances by cutting off artificial harmonics.

Clipping causes conspicuous, harsh distortion, which at its most extreme can result in rectangular waveforms. 3.2 The Gate section The main task of a Gate is to separate undesirable background noise from the program signal and "remove" it inaudibly. As described in Chapter 4.1.

4, a so-called Downward Expander automatically reduces the overall level for all signals below a user-definable threshold and thus increases the dynamic range of the program material. The Expander can thus be regarded as the opposite of a compressor/limiter. Expanders generally work with a relatively flat ratio characteristic to ensure that the signal is continuously suppressed. On the other hand, noise gates can be regarded as high-ratio expanders, which radically cut signals off that drop below the threshold. The BEHRINGER ULTRA-DYNE PRO is equipped with six Noise Gates with intelligent look-ahead functions.

The Threshold parameters can be set up individually for each band using faders in the EDIT menu of the PROCESS mode. Additional parameters such as the Hold and Release times and look-ahead can be found on setup level 2 in the band menus. The following definitions describe the parameters in greater detail: Gate Threshold: This is the value after which the audio signal no longer passes through the Gate. Gate Hold Time: The Gate Hold time is the duration of the wait after the Threshold has been passed before the release time begins. Gate Release Time: The Gate release time is the time in which the Gate returns the signal to 1:1 after the hold time has elapsed. Peak Width: Use the Peak Width parameter to set the maximum signal impulse width to be ignored by the Gate.

3. APPLICATIONS 21 ULTRA-DYNE PRO DSP9024 The Peak Width parameter is dependent upon the delay parameter in the <GLOBAL SETUP> menu. The Peak Width Gate parameter will have no effect if the delay has been set to 0 ms. In addition, the delay time set in the <GLOBAL SETUP> menu should be twice as long as the desired Peak Width time of the Gate.

Using the Peak Width parameter permits the ULTRA-DYNE PRO to identify and ignore brief signal peaks on the basis of their duration. For this reason, select a suitable setting for this parameter corresponding to the maximum duration of the signal peaks to be ignored. The peak width parameter also ensures that an open gate does not close for signals shorter than the set duration. 3.2.1 Suppression of crosstalk in multi-channel operation One of the most common applications for an expander/gate is the suppression of undesirable crosstalk between individual channels during recording and playback. This application is used very frequently when recording acoustic percussion instruments due to the close proximity of the microphones to one another. The high sound pressure levels of the individual instruments causes crosstalk in all of the neighboring microphones, leading not only to frequency cancellations but also to a lack of definition in the sound (comb filter effect). The optimal solution is thus to use a separate microphone for each instrument, with individual gating for each microphone. Insert the BEHRINGER ULTRA-DYNE PRO in the recording channel in of the snare, for example, and set the unit to respond to signals from the snare only.

Each microphone should be carefully positioned and checked beforehand, and the Threshold value set to ensure a clean acoustic separation of the drum sound, as if the instrument were being played alone. Correct miking technique is decisive for the optimal function of the Expander/Gate. Be especially careful when instruments with pronounced high frequencies are being played next to or behind a cardioid microphone. The directional characteristic of most microphones is considerably less effective at high frequencies. A difference of only 2 to 3 dB in the response sensitivity between the main and lateral axes in the 5 to 10 kHz range can result in severe cymbal crosstalk in the tom microphones, or masking of the snare by the hi-hat.

Take maximum advantage of the directional characteristics of the respective microphones to ensure the best possible acoustic isolation of the instruments. Be sure to do everything possible to isolate the individual sources with proper miking technique alone. Otherwise, the Expander/Gate will not be able to provide a clear acoustic separation. 3.2.

2 Basic settings of the Gate section Parameter Threshold Hold Time Release Time Peak Width Setting -90 dB 20 ms 20 ms 0 ms Tab. 3.1 Basic settings of the Gate section Begin with very low Threshold values so that the entire signal can pass unhindered. Next, move the fader upwards until all background noise has been removed and only the desired instrument is still audible. The hold time can be adjusted to optimize the unit for the program material. It may contain many, frequently short, pauses which can result in the Gate being activated repeatedly in short succession. The Hold function prevents the disturbing "flutter" common to conventional gates by delaying the release process. This ensures that the Gate remains open during short pauses. The Gate closes the audio channel in the preset release time after the hold time has elapsed. The release time may also be used to adapt the Gate perfectly to the program material.

As a rule, percussive audio material with little or no reverb is processed with quick release times, whereas longer release times are used for signals with a slow decay or heavy reverb. You will note that short release times are suitable for most percussion instruments, while longer times are generally required for toms and cymbals. 22 3. APPLICATIONS ULTRA-DYNE PRO DSP9024 Due to its digital design, the ULTRA-DYNE PRO Gate features a look-ahead function.



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