





**CAUTION**  
RISK OF ELECTRIC SHOCK  
DO NOT OPEN



The symbols shown above are internationally accepted symbols that warn of potential hazards with electrical products. The lightning flash with arrowhead in an equilateral triangle means that there are dangerous voltages present within the unit. The exclamation point in an equilateral triangle indicates that it is necessary for the user to refer to the owner's manual.

These symbols warn that there are no user serviceable parts inside the unit. Do not open the unit. Do not attempt to service the unit yourself. Refer all servicing to qualified personnel. Opening the chassis for any reason will void the manufacturer's warranty. Do not get the unit wet. If liquid is spilled on the unit, shut it off immediately and take it to a dealer for service. Disconnect the unit during storms to prevent damage.

#### DECLARATION OF CONFORMITY:

This equipment has been tested and found to comply with the following international Standards for Electromagnetic Compatibility and Electrical Safety:

##### EMC:

Radio Disturbance (EU):	EN55013	(1994)
Harmonics (EU):	EN61000/3/2	(1995)
&		
Flicker (EU):	EN61000/3/3	(1995)
Immunity (EU):	EN50082/1	(1997)

##### SAFETY:

Electrical Safety (EU):	EN60065	(1998)
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For continued compliance with international EMC legislation ensure that all input and output cables are wired with the cable screen connected to Pin 1 of the XLR connectors. The input XLR Pin 1 is in any case connected to the chassis via a low value capacitor, providing high immunity from ground loops whilst ensuring good EMC performance. The best solution is to connect the Pin 1 directly to the chassis at input and output assuming the interconnected devices are balanced and with Pin 1 also grounded to the chassis (see Appendix II: Jumpers for details).

#### TRADEMARK NOTICE:

The software included in this unit is licensed by Algorithmix® GmbH, Germany. All rights reserved.

#### WARNING

##### FOR YOUR PROTECTION PLEASE READ THE FOLLOWING:

**WATER AND MOISTURE:** Unit 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). Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.

**EXCESSIVE HEAT:** This unit has to be placed in a rack with adequate ventilation. Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.

**POWER SOURCES:** The unit should be connected to a power supply only of the type described in the operating instructions or as marked on the unit. Check that correct operating voltage is set on the rear panel voltage switch/fuse holder before connecting mains power.

**GROUNDING OR POLARIZATION:** Precautions should be taken so that the grounding or polarization means of an unit is not defeated. The mains power cord is fitted with a safety earth (ground). Do not operate this unit with this connection removed.

**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 at plugs, convenience receptacles, and the point where they exit from the unit.

**SERVICING:** To reduce the risk of fire or electric shock, the user should not attempt to service the unit beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

**EXTERNALLY ACCESSIBLE FUSE RECEPTACLE:** Replace fuse with same type and rating only.

**MULTIPLE-INPUT VOLTAGE:** This equipment may require the use of a different line cord, attachment plug, or both, depending on the available power source at installation. Connect this equipment only to the power source indicated on the equipment rear panel. To reduce the risk of fire or electric shock, refer servicing to qualified service personnel or equivalent.

**LITHIUM BATTERY:** This product may contain a lithium battery. There is danger of explosion if the battery is incorrectly replaced. Replace only with an Eveready CR 2032 or equivalent. Make sure the battery is installed with the correct polarity. Discard used batteries according to manufacturer's instructions.

**Attention!** Cet appareil doit être relié à la terre.

Attention! Risque de choc électrique; ne pas ouvrir.

Attention! Risque de choc ne pas oter les capots. Aucune pièce accessible à l'intérieur. S'adresser à un technicien qualifié.

Attention! Por réduire le risque d'incendie ou de choc électrique, ne pas laisser l'appareil sous la pluie ou à l'humidité.

**Achtung!** Dieses Gerät muss geschützt sein.

Achtung! Gefahr eines elektrischen Stromschlags. Gehäuse nicht öffnen.

Achtung! Keine vom Benutzer zu bedienenden Teile im Geräteinneren. Überlassen Sie das Gerät zu Servicezwecken nur geschultem Fachpersonal. Um Brandgefahr oder das Risiko eines elektrischen Schlags auszuschließen, das Gerät vor Nässe und Feuchtigkeit schützen.

**Advertencia!** Este equipo debe estar conectado a tierra.

Precaución! Riesgo de descarga eléctrica. No abrir.

Precaución! Riesgo de descarga eléctrica. No desmontar las tapas. Piezas interiores no reparables por el usuario. Reparable sólo por personal cualificado.

Advertencia! Para reducir el riesgo de incendio o de descarga eléctrica no exponga este producto a la lluvia o humedad.

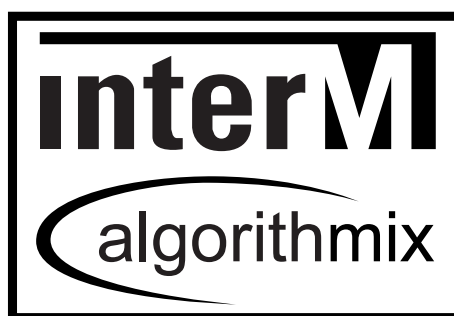
## Welcome

Congratulation for the purchasing **MEQ-2000**, a state-of-the-art digital multimode equalizer with extended frequency range. It is a result of a professional cooperation between two audio companies: **ALGORITHMIX**, having great expertise in developing high-precision audio signal processing algorithms and DSP hardware, and **INTER-M**, very well known for its high-quality engineering and manufacturing technology in the field of professional audio equipment.

Thanks to high-quality AD/DA converters, the constant internal sampling rate of 96 kHz, and very precise low-noise digital filters the **MEQ-2000** delivers warm analog sound and outstanding digital features.

The **MEQ-2000** is the first member of the **DSP-2000** family. Further devices will follow. To minimize the learning time when operating different devices, we have tried to keep the same man-machine interface for every family member. We color-coded the front panels to help distinguish between them. Your **MEQ-2000** is blue, therefore the name: *DSP blue*.

We wish you great enjoyment and satisfaction when using your multimode equalizer, whether you are a recording, mastering, or reinforcement engineer.



ADVANCED DSP TECHNOLOGIES

## Contents

<b>1. INTRODUCTION</b> .....	1
<b>2. TYPICAL APPLICATIONS</b> .....	2
<b>3. MAIN FEATURES</b> .....	2
<b>4. GETTING STARTED</b>	
4-1. Front Panel Controls .....	3
4-2. Rear Panel Controls .....	4
4-3. Signal Flow Diagram .....	5
4-4. Operating Modes .....	6
4-5. Quick Start .....	7
<b>5. SETUP MENU</b>	
5-1. Device Status .....	8
5-2. General Concept of Setup Screen .....	10
5-3. Parametric Equalizer – PEO .....	12
5-4. Graphic Equalizer – GEO .....	14
5-5. Notch and Cut Filters – CUT .....	16
5-6. Delay – DELAY .....	18
5-7. Compressor/Limiter – COM/LIM .....	20
5-8. Limiter – LIMITER .....	23
5-9. Real-Time Analyzer – RTA .....	25
5-10. Level Adjustment – LEVELS .....	27
5-11. Reference Generator – GEN .....	29
5-12. Setup Menu Structure .....	32
<b>6. UTILITY MENU</b>	
6-1. Device Status .....	33
6-2. System Configuration – CONFIG .....	35
6-3. Typical Digital Interconnections .....	39
6-4. Remote Control – REMOTE .....	40
6-5. ADC Calibration – ADCAL .....	41
6-6. Device Security Lock – LOCK .....	42
6-7. Device ID-Numbers – ID .....	43
6-8. Auxiliary Functions – AUXILIARY .....	44
6-9. Software Update – UPDT .....	45
6-10. Utility Menu Structure .....	46
<b>7. MEMORY MENU</b> .....	47
<b>8. TECHNICAL SPECIFICATIONS</b> .....	50
<b>9. LIMITED WARRANTY</b> .....	55
<b>APPENDIX I : SysEx Definitions</b> .....	56
<b>APPENDIX II : Jumpers</b> .....	78

### OFFICE :

653-5 BANGHAK-DONG, DOBONG-KU, SEOUL, KOREA  
 TEL : 82-2-2289-8140~8, FAX : 82-2-2289-8149

Home Page : <http://www.inter-m.com>

E-mail : [export@inter-m.com](mailto:export@inter-m.com)

## Introduction

**MEQ-2000 24/96 MULTIMODE EQUALIZER**, also called *DSPblue*, is the first member of our new digital audio 19" processor family, the **DSP-2000**. Because of high-quality converters, internal sampling rate remaining *96 kHz* and the power of very precise digital signal processing functions, the **MEQ-2000** delivers warm analog sound and outstanding features. 6-band notch, low-cut, and high-cut filters support the 31-band graphic equalizer and 8-band parametric equalizer. For sound finishing in mastering mode, a combined *limiter/compressor* is available and for loudspeaker protection in reinforcement mode, a reliable *peak-limiter* is provided. A separate *delay* in every input channel permits adjusting the sound for different loudspeaker or spot microphone positions. The processor offers two fully independent channels which can be coupled for stereo use.

In connection with other members of the **DSP-2000** audio processor family, the **MEQ-2000** remains in *the 24/96 digital domain* through the whole audio processing path, maintaining the highest signal fidelity. The dithering and noise shaping options at the output of the processing chain take care of the audio quality if tailoring down to 16-bit CD.

The **MEQ-2000** incorporates high-quality 24bit/96kHz *AD* and *DA converters*, as well as a sophisticated *sample rate converter* allowing digital input to accept every sample frequency between 20 kHz and 100 kHz and digital output to deliver every typical sample frequency used in digital audio.

The remote control capability via MIDI or RS-232 permits cascading the devices with other members of the **DSP-2000** family or third party equipment and conveniently controlling the parameters over a PC compatible computer equipped with proprietary remote software.

The **MEQ-2000** is an ideal universal tool for every recording, mastering, and reinforcement engineer.

## Typical Applications

### Two-channel or stereo digital recording/mastering equalizer:

- analog and digital tracking, mixing and mastering
- sound shaping and compression
- critical material processing (notch, high-cut, low-cut)
- conversion between different analog and digital formats
- sensitive treatment of solo tracks

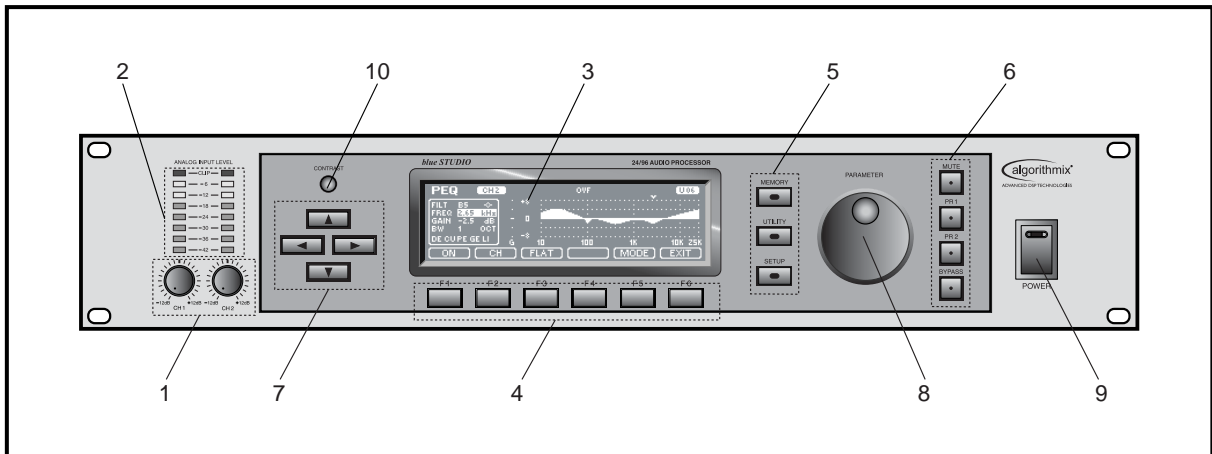
### Two-channel or stereo digital sound reinforcement equalizer:

- sound field control
- balancing of the room characteristics
- microphone alignment
- speaker compensation and protection
- manual feedback reduction
- automatic room measurement

## Main Features

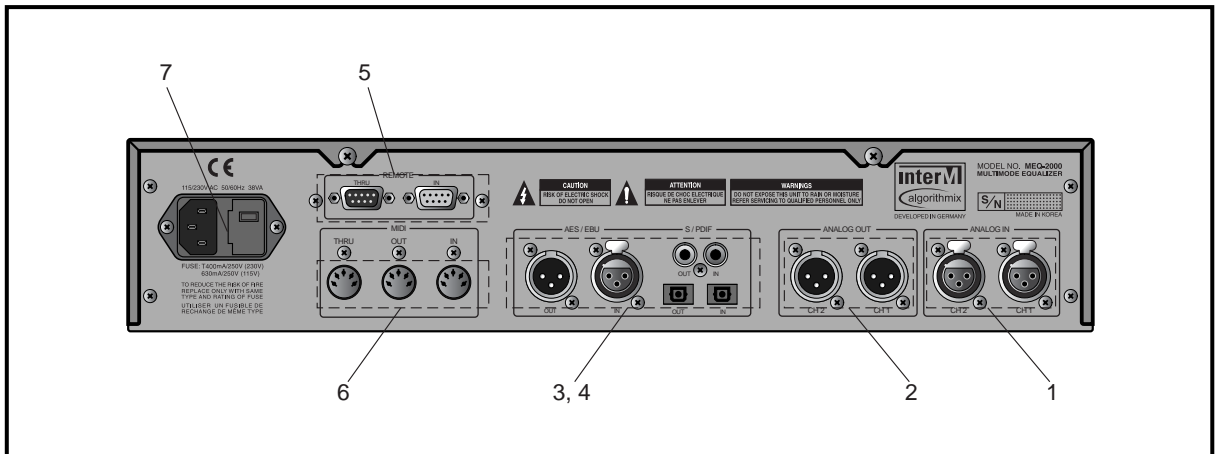
- High-End 24-bit 96 kHz A/D and D/A Converters
- Digital I/O on AES/EBU or S/PDIF with comprehensive Sample Rate Conversion  
Input Rates: 20 – 100 kHz, Output Rates: 32, 44.1, 48, 64, 88.2, 96 kHz
- Superior THD+N performance ( < 0.001% ) for the crystal clear sound
- 40-bit Internal Signal Path to maintain increased head-room and low-level signals
- Up to 80-bit Processing Accuracy for the lowest digital distortion
- Internal Sampling Frequency always on 96 kHz to achieve analog-like processing
- Inherent System Delay less than 1 ms
- Extended Frequency Bandwidth up to 31.5 kHz
- Output Dither at 16, 20, or 24 bits
- 8-Band Fully Parametric Equalizer:  
Low Shelving, 6 x Bell, High Shelving
- Low-Cut and High-Cut Filters with switchable slopes
- 6-Band Notch Filters for feedback suppression
- 31-Band Graphic Equalizer
- Visually displayed filter curves
- True Peak Limiter for loudspeaker protection
- Mastering Limiter/Compressor with Adaptive Knee and Auto-Release
- Absolutely seamless parameter update
- Intuitive Programming and Real-Time Navigation Interface
- Unique Parameter Wheel with built-in dynamic behavior for convenient parameter entry
- Two Temporary Preset buttons for real-time setup comparison
- 64 Factory and 128 User Presets
- Remote Control via MIDI or RS-232
- Software Update via Internet and RS-232

## Front Panel Controls



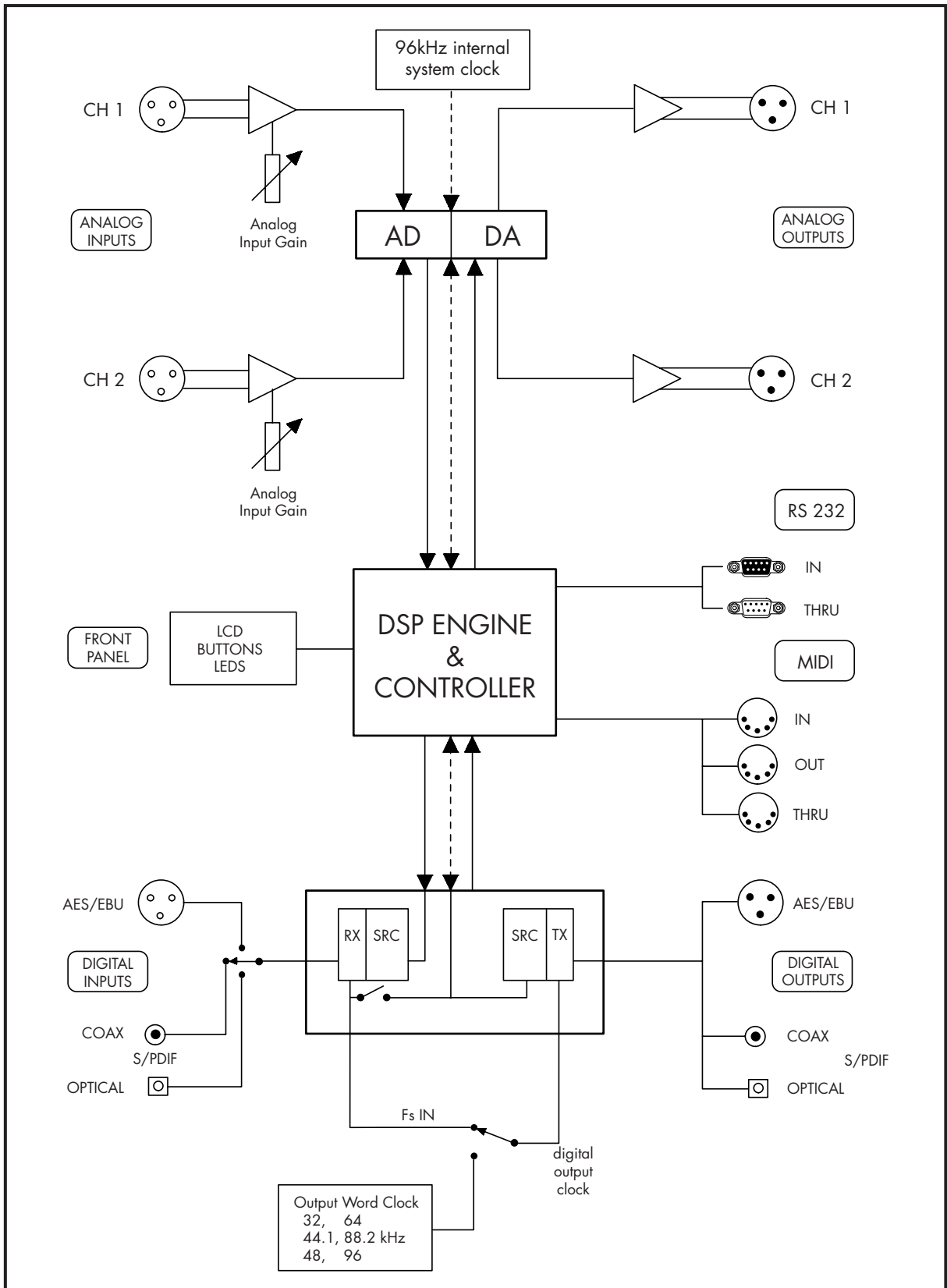
1. Two Analog Input Level Potentiometers with  $\pm 12$  dB range
2. Two 8-segment LED Quasi-Peak Analog Level Displays with Clip
3. LCD Display: blue, 240 x 64 dots with EL backlight
4. Six Menu Soft Keys (F1 – F6)
5. Three Display Mode Keys with LEDs: Setup, Utility, Memory
6. Four Function Keys with LEDs: Mute, Bypass, Preset 1, Preset 2
7. Cursor Keys: Up, Down, Left, Right
8. Parameter Wheel
9. Power Switch
10. LCD Contrast Adjustment

## Rear Panel Controls



1. Analog Audio Inputs: 2 x XLR-F
2. Analog Audio Outputs: 2 x XLR-M
3. Digital Audio Inputs: AES-3 (XLR-F), S/PDIF coax (RCA), S/PDIF optical (TOS-Link)
4. Digital Audio Outputs: AES-3 (XLR-M), S/PDIF coax (RCA), S/PDIF optical (TOS-Link)
5. Remote: RS-232 IN and THRU (2 x 9-pin SUB-D)
6. MIDI: IN, OUT, THRU (3 x 5-pin DIN)
7. AC Inlet: IEC Receptacle, Fuse Holder, and Voltage Switch

# Signal Flow Diagram



## Operating Modes

The **MEQ-2000** is intended for different applications:

- recording
- mixing
- mastering
- sound reinforcement
- acoustical measurements

In the **UTILITY** menu a special configuration function (**CONFIG**, Page 35) is implemented. It allows various module configurations, optimized for the different applications mentioned above. All the modules in the audio processing chain can be used simultaneously. The device can be used in dual-channel mode with two independent channels or in different mono modes. In dual-channel mode all processing functions can be set up independent pro channel, or coupled to the stereo mode.

The signal flow diagram in the previous section shows that the **MEQ-2000** accepts and outputs every kind of professional and consumer audio formats:

- electronically balanced analog inputs, also well accepting unbalanced sources
- electronically balanced audio outputs, also compatible with asymmetrical loads
- every kind of digital audio inputs and outputs:  
XLR, coaxial and optical compatible with all current audio standards:  
AES/EBU or AES -3, SPDIF, IEC 958 and EIAJ CP-340 (all transformer balanced)

The digital audio inputs accept every sampling frequency between 20 kHz and 100 kHz. The output sampling frequency can be chosen to any typical sampling frequency today used: 32 kHz, 44.1 kHz, 48 kHz, 64 kHz, 88.2 kHz and 96 kHz. Digital audio signals up to 24 bits are accepted at the input and provided at the output.

For more technical details look at Section 8, *Technical Specifications*.

## Quick Start

- Your **MEQ-2000/DSPblue** was carefully manufactured, tested, burned in, and packaged in our factory. Before you proceed further, check to be sure the following items are included in the packaging box:
  - **MEQ-2000** Multimode Equalizer
  - Operating Manual
  - Power Cord
- Save all packing materials. They are intended to protect the unit during shipping, and in the unlikely event that your **MEQ-2000** requires service.
- If you are a plug-and-play-and-read-later user, follow these simple instructions and get on your way. For a professional, the intuitive man-machine interface on your **MEQ-2000** will be clear within minutes.
- Be sure that the power switch in your **MEQ-2000** is OFF and the devices you want to use as source and receiver are also switched off.
- Connect a line level audio source (preferably balanced) to the analog inputs and the analog outputs to balanced line inputs of a mixing console or active loudspeakers. Later you can also check the digital audio input/output of your **MEQ-2000**.
- Be sure that the voltage selector on the rear panel is in the right position: 230V or 115V dependent on the country you are. Plug in the power cord and switch on the **MEQ-2000** as well as interconnected devices.
- Setup the proper Analog Input Level with the potentiometers on the left side of the front panel carefully observing Input Level Meters to avoid clipping.
- Hit the UTILITY button and check in the Device Status screen if the analog input and output are selected; if no, press the button CONFIG, select the analog input and output, and confirm with the EXIT button.
- Check if the signal is going thru by pressing BYPASS button.
- Press the SETUP button and select one of the familiar names like **PEQ** or **GEQ** associated with the function buttons F1 – F5; hit one of the buttons, e.g., **GEQ** and you will get in the **GEQ** menu; switch ON **GEQ** with the ON button (appears inverted) and start to change the parameters with cursor keys and parameter wheel. Enjoy your first experiences and look for details in this *Operating Manual*.

## Device Status

After pressing SETUP button placed at the right side of the LCD you get into SETUP menu: the screen shows **DEVICE STATUS** and the soft keys show the possible functions you can enter. There are still further functions after pressing MORE button. The **DEVICE STATUS** tells you about actual device configuration, as well as audio inputs and outputs. This information is very helpful when having any troubles with digital inputs or outputs.

DEVICE STATUS					
INPUT: ANALOG	FSI: - - -	WLI: - - -	SRG: ON		
OUTPUT: AN+DI (CON)	FSO:48 kHz	WLO: 24 BITS	SRGO: ON		
CONFIG: MA-1	LOCK: OFF	REMOTE: OFF			
FS INTERNAL: 96 kHz	FSI MEASURED: 33.95 kHz				
PEQ	GEQ	CUT	DELAY	LIM	MORE

There are six active buttons in SETUP mode:

- F1** PEQ lets you enter the 8-band fully parametric equalizer menu
- F2** GEQ switches to 31-band graphic equalizer
- F3** CUT enters set of cutting filter : low-cut and high-cut with adjustable slopes, and six notches
- F4** DELAY switches to the delay module with two 1.3 seconds delay lines
- F5** LIM (in RE-1 and RE-2 configuration mode) switches to a reliable peak limiter used for loudspeaker protection;  
COMP (in MA-1 and MA-2 mastering mode) selects the combined mastering/recording limiter/compressor menu
- F6** MORE allows you to get to the Page 2 with further functions;  
to get back to the Page 1 press MORE again; after 10 seconds without any action Page 1 is automatically called back

On the Page 2 following modules are available:

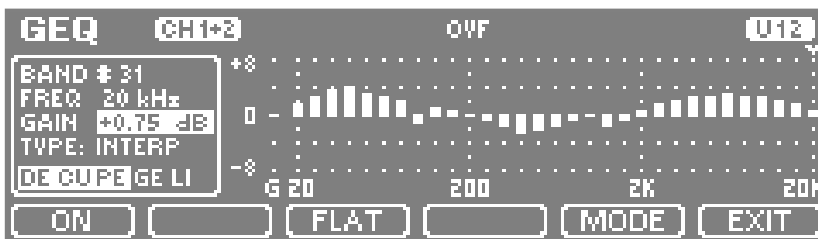
- F1** RTA opens real-time spectrum analyzer
- F2** LEVELS allows to enter the digital level adjusting menu
- F3** GEN appears only if the configuration mode ME-1 or ME-2 in CONFIG menu has been chosen and offers extremely high-quality reference generator
- F6** MORE switches back to the Page 1

The **DEVICE STATUS** screen delivers important information:

- INPUT shows the input chosen in the **CONFIG** menu;  
if a digital input has been selected and it is receiving valid digital audio signal the format of the incoming signal in parenthesis is shown:  
professional (PRO), or consumer (CON).
- FSI, WLI if a digital input has been selected and it is receiving a valid digital audio signal the sampling frequency (FSI) and wordlength (WLI) are shown as indicated in the status bits of the incoming digital signal (they are not measured, only extracted)
- SRCI tells if the input sampling rate converter is active
- OUTPUT shows the output chosen in **CONFIG** menu;  
if the digital output has been selected the chosen format is shown in parenthesis:  
professional (PRO) or consumer (CON)
- FSO, WLO if the digital output has been selected FSO shows the sampling frequency and WLO the wordlength as set up in CONFIG
- SRCO tells if the output sampling rate converter is active
- CONFIG indicates the module configuration as chosen in **CONFIG** menu
- LOCK informs if the buttons and *parameter wheel* on the front panel are set locked or unlocked in the DEVICE LOCK menu
- REMOTE indicates the type of remote interface: RS-232, MIDI or OFF, as selected in **REMOTE** Control menu
- INTERNAL FS tells that the internal sampling frequency is always 96 kHz
- FSI MEASURED shows the actual sampling frequency of the signal at chosen digital input as measured by **MEQ-2000**;  
a result between 0 - 40 kHz (not very close to 32 kHz) indicates usually that there is no valid signal at the digital input;  
the FSI in the first line may not agree with the actual measured frequency; it can be wrong or not indicated at all

## General Concept of Setup Screen

The **MEQ-2000** is a complex multifunction device that can replace a full rack of 19" units. To get into the processing functions, press the SETUP button. The STATUS screen appears telling you about the actual hardware setup. On the bottom of the screen, you can see six virtual buttons. Five of them bring you to the functions: **PEQ**, **GEQ**, **CUT**, **DELAY**, **LIMITER**. After pressing MORE you get to the second page including two further processing functions: **RTA** and **LEVELS**. The second page, if no action is taken, reverts back to the first page automatically after ten seconds. There are some common rules on working with the processing function screens. Let's use the graphic equalizer (**GEQ**) screen for an example.



Every processing function screen consists of:

- Six *soft keys* (buttons) on the bottom which can change their labels dependent on the processing function being chosen
- *Parameter window* on the left covering parameters and numerical fields to be adjusted. (Sometimes the fields are also used for monitoring the value of a parameter chosen in the characteristic). You can use *cursor keys* ▲▼ to select the parameter and change its value with the *parameter wheel*. The *cursor keys* ◀▶ are used differently dependent on the selected module, mostly to choose the active filter (**PEQ**, **GEQ**, **CUT**) or the path (**DELAY**, **LEVELS**).

At the bottom of the *parameter window* is the module activity status line. It says which modules are in the processing chain (see **CONFIG** in **UTILITY** setup, page 35) and which of them are active (set ON). The active modules are highlighted. In our example above we have five main functions in the processing chain: DELAY (DE), CUT (CU), PEQ (PE), GEQ (GE) and LIMITER (LI). DELAY, CUT and PEQ are active (switched ON), GEQ and LIMITER are non active (switched OFF).

Four soft keys have in every processing function the same meaning:

- F1** ON turns the function ON or OFF; ON status is shown by inverting the button (in our example the **GEQ** is OFF)
- F2** CH is active only if you work with independent channels in so called dual-channel mode. This mode can be activated in the MODE menu by switching the parameter CH LINK to OFF. In another case, i.e., if the both channels are linked, the F2 button stays empty
- F5** MODE brings you to the advanced setup options that are normally changed rarely after you have discovered your favorite setup.
- F6** EXIT switches back to the LCD screen with the main **SETUP** window showing the system status and allowing selection of other functions as the one selected before.

The soft keys F2, F3 and F4 have different functions dependent on the chosen processing module.

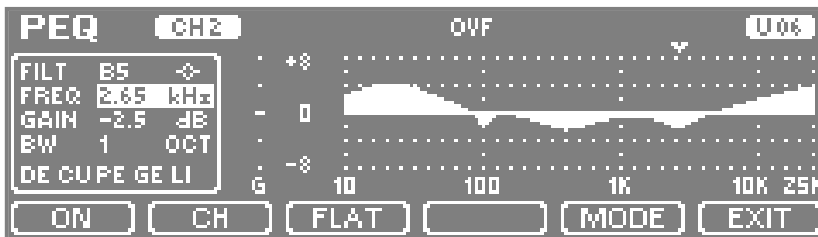
In the *upper status line* you can see the name of the chosen processing function, channel number (CH1, CH2, or CH1+2 if channels are linked), the overflow warning field OVF, the digital input warning field, and the preset number. The output overflow warns you against clipping with the flashing OVF field if the audio signal at the output has exceeded clipping level. This can happen if you boost the signal with the equalizer without correcting the overall gain (e.g., with **GEQ** MASTER GAIN in our example).

If you have selected a digital input in the **CONFIG** menu (see page 35) and for any reason no valid signal is provided to this input, in the upper status line a flashing message \*UNLOCKED\* appears and the input is muted. In such case you need to search for the reason.

Due to the unique proprietary movement control algorithm, *AlgoDyn™*, the parameter adjustment with the *parameter wheel* is exceptionally convenient in **MEQ-2000**. Two normally opposite requirements -- big adjustment steps and the finest resolution -- are possible now only with the *parameter wheel*, without annoying range switching. The increment or decrement value of a given parameter is dependent on the speed you turn the wheel. While speeding up you can reach big values very quickly, when turning slowly you can adjust parameters with the finest steps available.

## Parametric Equalizer (PEQ)

The **PEQ**, a fully parametric equalizer, gives you possibility of extremely low-distortion equalization with eight high-precision digital filters: six constant-Q bells, low shelving and high shelving. To compensate the overall gain changes after extensive equalizing (especially boosting), a Master Gain parameter is provided.



There are five active buttons in **PEQ** mode:

- F1** turns the **PEQ** ON or OFF.
- F2** toggles between CH1 and CH2 setup (only if CH LINK in MODE menu is OFF).
- F3** sets equalizer FLAT and changes to UNDO allowing switch back, but only as long as you have not changed any parameter.
- F5** switches to MODE menu containing advanced options (see page 13).
- F6** EXIT switches back to the main SETUP screen.

**PEQ** parameters can be changed in the *parameter window*. Using **▲▼ cursor keys** you can highlight the particular parameter and change its value with the *parameter wheel*. The **◀▶ cursor keys** allow a fast filter band selection. The selected band is monitored in the field FILT and pointed by the flashing arrow over the filter characteristic.

Parameters adjustable or monitored in *parameter window*:

- **FILT** shows the filter band or master gain selected with ◀▶ *cursor keys*:  
M GAIN (master gain), LS (low shelving), B1 up to B6 (bell no. 1 to 6), HS (high shelving)
- **FREQ** sets up the filter center frequency (for bells) or corner frequency (for shelvings) in the extended audio frequency range from 10 Hz to 25 kHz in 1/12 octave steps
- **GAIN** changes the boost or cut value for the active filter and Master Gain;  
two amplitude ranges can be selected in MODE menu:  
±8 dB with 0.125 dB/step and ±16 dB with 0.25 dB/step
- **BW** (or **Q**) selects the filter bandwidth of the active bell filter in the range from 1/12 octave to 2 octaves in nine steps (or if using **Q** from 17.31 to 0.667); bandwidth units which are convenient for you can be selected in MODE menu
- **SLP** appears instead of **BW** (or **Q**) when LS (low shelv) or HS (high shelv) is chosen in **FILT**;  
it selects the shelving slope: 3, 6 or 9 dB/oct

By pressing MODE button, you can get to the **PEQ** MODE screen which allows global setups for the **PEQ** module.



The parameter you want to change can be selected with the ▲▼ *cursor keys* and changed with the *parameter wheel*. After every change, ENTER appears in the key F5. You need to press this button to confirm your last change. If you are not sure of the proper global setup you can switch to default settings by pressing DEF (F1). EXIT (F6) allows to go back to **PEQ** screen.

The global parameters in **PEQ** MODE screen are:

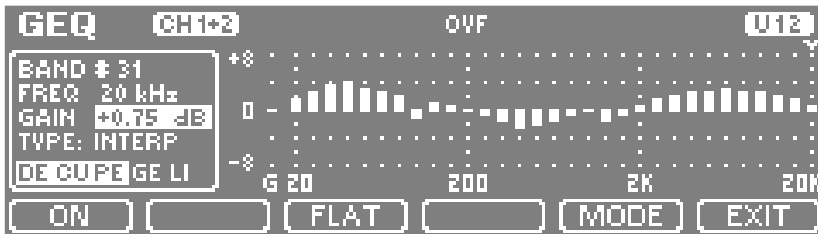
- CH LINK determine the channel coupling status:  
switch OFF when you want to work in dual-channel mode, e.g., with two independent channels;  
select CH1 → 2 if you want to couple the channels in the way that CH2 takes over the setup of CH1;  
select CH2 → 1 if you want to couple the channels in the way that CH1 takes over the setup of CH2;  
if both channels are coupled [CH1+2] appears in the *upper status line* of the **PEQ** screen and button [F2] stays empty
- RANGE selects the adjustment range of the **PEQ** module:  
±8 dB with 0.125 dB/step and ±16 dB with 0.25 steps
- BW UNIT selects units for bandwidth: *octave* or **Q**

Default values (after pressing DEF button):

CH1 → 2, ±8 dB, OCT.

## Graphic Equalizer (GEQ)

The **GEQ** gives you a possibility of a precise 1/3-octave equalization with 31 constant-Q filters equally spaced in the range from 20 Hz to 20 kHz.



There are five active buttons in **GEQ** mode:

- F1** turns the **GEQ** ON or OFF.
- F2** toggles between CH1 and CH2 setup (only if CH LINK in MODE menu is OFF).
- F3** sets equalizer FLAT and changes to UNDO allowing switch back, but only as long as you have not changed any parameter.
- F5** switches to MODE menu containing advanced options (see page 15).
- F6** EXIT switches back to the main SETUP screen.

In the *parameter window* the setup for the selected band is displayed:

band number (BAND), center frequency (FREQ), GAIN, TYPE as well as the status line telling about other modules in processing chain.

Using **▲▼ cursor keys** or the *parameter wheel* you can change the gain of the selected filter. The flashing arrow over the filter characteristic points to the active band being adjusted in the *parameter window*.

Parameters adjustable or monitored in *parameter window* are:

- **BAND** shows the active filter band or master gain:  
M GAIN (master gain), #1 UP TO #31 (band number); it can be selected with **◀▶ cursor keys**
- **FREQ** shows the center frequency associated with the selected band number
- **GAIN** changes the boost or cut value for the active filter; two amplitude ranges can be selected in MODE menu:  $\pm 8$  dB with 0.25 dB/step and  $\pm 16$  dB with 0.5 dB/step in MODE menu by pressing F5
- **TYPE** informs about the filter bank used for the graphic equalizer:  
asymmetrical, analog-like parallel structure (PARALLEL) and precise ALGORITHMIX proprietary *AlgoGEQ™* interpolating filter bank (INTERP). The parallel filter bank is recommended for  $\pm 8$ dB range and especially for boosting. The interpolating **GEQ** works well with every setup, especially for extremely boost or cut of many neighborhood bands. It keeps the overall amplitude according to the fader adjustment avoiding extreme amplitude overloads, typical for standard GEQs

By pressing MODE button you can get to the **GEQ** MODE screen which allows global setups for **GEQ** module.



The parameter you want to change can be selected with the ▲▼ and ◀▶ *cursor keys* and changed with *parameter wheel*. After every change ENTER appears over the key F5. You need to press this button to confirm your last change. If you are not sure of proper global setup you can switch to the default settings by pressing DEF (F1). EXIT (F6) allows going back to **GEQ** screen.

The global parameter in **GEQ** MODE screen:

- CH LINK determines the channel coupling status:  
switch OFF when you want to work in dual-channel mode, e.g., with two independent channels;  
select CH1 → 2 if you want to couple the channels in the way that CH2 takes over the setup of CH1;  
select CH2 → 1 if you want to couple the channels in the way that CH1 takes over the setup of CH2;  
if both channels are coupled [CH1+2] appears in the *upper status line* of the **GEQ** screen and button [F2] stays empty
- RANGE selects the boost/cut range of the **GEQ** module:  
±8 dB with 0.25 dB/steps and ±16 dB with 0.5 steps
- TYPE sets the type of **GEQ** filter bank: parallel (PARALLEL) or interpolating (INTERP)
- DISPLAY chooses the kind of **GEQ** display: beams or faders
- WEIGHT sets **GEQ** reference according to a normalized spectrum envelope (RTA) stored in the RTA MODE screen (see **RTA** module, page 26), to another **GEQ** setting stored as reference (MGEQ) in GEQ MODE screen (see below), or switches it OFF (no reference)
- REFERENCE says whether the reference characteristics should be considered (SHOW) or not (HIDE) in the **GEQ** display; if SHOW is active the reference is graphically added to your setup after you have opened the **GEQ** screen; as soon as you start editing gains the reference is made flat (only in the graphic) to give you better feeling whether your own equalization still remains within the chosen range (±8 or ±16 dB) or not (because the sum of reference and additional equalization can exceed 16 dB which is normally not recommended, but possible); to see final equalization curve including both the reference and your added equalization press EXIT or MODE and get to **GEQ** screen again; be aware that even if the resulting gains exceed the chosen range the beams will be limited to the chosen range (but only in the graphic)

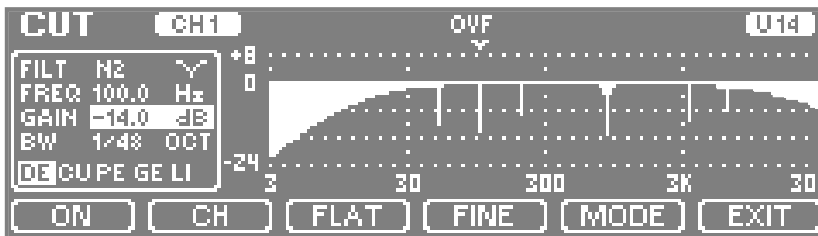
If the unit is in measurement mode ME-1 or ME-2 the parameters WEIGHT and REFERENCE are not active.

After pressing F3 button (GREF) the current **GEQ** setup is internally stored for reference as MGEQ in the above described REFERENCE parameter. It is very useful as a base room equalization estimated in ME-1 or ME-2 mode, or for compensation of electrical or acoustical system measurement characteristic. The F3 button in the **GEQ** MODE screen becomes GREF function only if WEIGHT is OFF and REFERENCE is set to HIDE.

Default values (after pressing DEF button):  
CH1 → 2, ±8 dB, INTERP, BEAMS, OFF, HIDE.

## Notch and Cut Filters (CUT)

**NOTCH** and **HIGH/LOW-CUT** Filters gives you the possibility of effective feedback or hum suppressing with six very narrow adjustable notches. Smooth correction of low and high frequency end is possible with a set of low-cut and high-cut filters with adjustable slopes.



There are six active buttons in **CUT** mode:

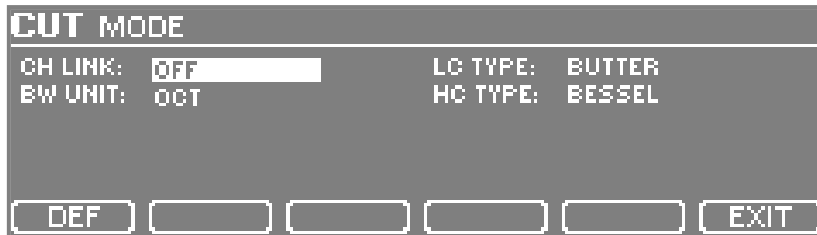
- F1** turns the **CUT** module ON or OFF.
- F2** toggles between CH1 and CH2 setup (only if CH LINK in MODE menu is OFF).
- F3** sets all filters FLAT and changes to UNDO allowing switch back, but only as long as you have not changed any parameter.
- F4** selects adjustment steps to coarse or fine (FINE inversed).
- F5** switches to MODE menu containing advanced options (see page 17).
- F6** EXIT switches back to the main SETUP screen.

**CUT** parameters can be changed in the *parameter window*. Using the **▲▼** *cursor keys* you can highlight the particular parameter and change its value with the *parameter wheel*. The **◀▶** *cursor keys* allow a fast filter band selection. The selected band is monitored in the field **FILT** and pointed by the flashing arrow over the filter characteristic.

Parameters adjustable in *parameter window* are:

- **FILT** selects active filter: Low-Cut (LC), Notches (N1-N6), High-Cut (HC)
- **FREQ** sets up the filter center frequency (for notches) or corner frequency (for Low/High-Cut) in the range from 3 Hz to 3 kHz for Low-Cut, 20 Hz to 20 kHz for Notches and 300 Hz to 30 kHz for High-Cut (every filter in 1/12 octave steps or 1 Hz resolution in FINE mode)
- **GAIN** changes the boost or cut value for Notches in the range from 0 to -24 dB with 1 dB/step; for the manual feedback searching the notches N1 - N6 can also be adjusted to a positive gain (up to +8 dB).
- **BW** (or **Q**) selects the filter bandwidth of the active Notch to 1/48, 1/24, 1/12 or 1/6 octave or if using **Q** : 69.3, 34.6, 17.3, 8.65; bandwidth unit which is convenient for you can be selected in MODE menu by pressing F5
- **SLP** appears instead of **BW** (or **Q**) when LC or HC is chosen in **FILT**; it selects the shelving slope to OFF, 6, 12, 18 dB/oct; OFF means that the low-cut or high-cut filter is bypassed.

By pressing MODE button you can get to the **CUT** MODE screen which allows global setups for **CUT** module.



The parameter you'd like to change can be selected with the ▲▼ and ◀▶ *cursor keys* and changed with *parameter wheel*. After every change ENTER appears over the key F5. You need to press this button to confirm your last change. If you are not sure of proper global setup you can switch to default settings by pressing DEF (F1). EXIT (F6) allows a return to the **CUT** screen.

The global parameter in **CUT** MODE screen:

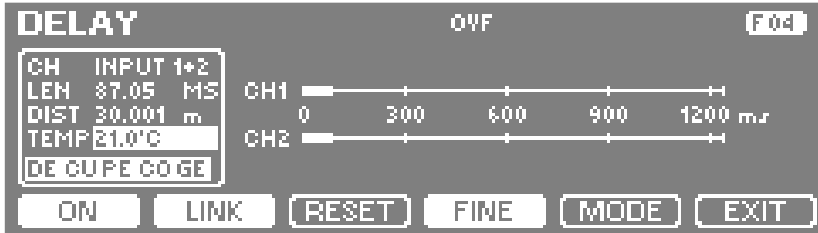
- CH LINK determine the channel coupling status:
  - switch OFF when you want to work in dual-channel mode, e.g., with two independent channels;
  - select CH1 → 2 if you want to couple the channels in the way that CH2 takes over the setup of CH1;
  - select CH2 → 1 if you want to couple the channels in the way that CH1 takes over the setup of CH2;
  - if both channels are coupled [CH1+2] appears in the upper status line of the **CUT** screen and button [F2] stays empty
- BW UNIT selects the units for bandwidth: *octave or Q*
- LC TYPE selects the low-cut filter characteristic to *Butterworth or Bessel*
- HC TYPE selects the high-cut filter characteristic to *Butterworth or Bessel*

Default values (after pressing DEF button):

CH1 → 2, OCT, BUTTER, BUTTER.

## Delay

The **DELAY** allows you to align delays for different loudspeakers or microphones positions considering actual environment temperature.



There are six active buttons in **DELAY** mode:

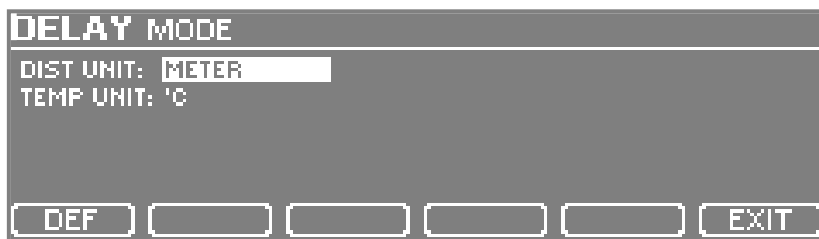
- F1** turns the **DELAY** ON or OFF.
- F2** LINK couples the both channels: in CH field appears INPUT 1+2.
- F3** RESET sets the Delay to 0 ms (and allows switching back to the old value with UNDO, but only as long as you have not changed any parameter after pressing RESET).
- F4** FINE selects adjustment resolution to coarse or fine (FINE button inversed).
  - When LENGTH is highlighted the delays increase/decrease in 1 ms steps or in 0.01 ms steps in FINE mode.
  - When DIST is highlighted: the distance increment is calculated according to the delay increment rules described above and to the adjusted environment temperature in TEMP field.
- F5** switches to MODE menu allowing advanced options setup (see next page, MODE menu).
- F6** EXIT switches back to the main SETUP screen.

**DELAY** parameters can be changed in the *parameter window*. Using the ▲▼ *cursor keys* you can highlight the particular parameter and change its value with the *parameter wheel*. The ◀▶ *cursor keys* allow fast toggling between channels (only if LINK is inactive).

Parameters adjustable in *parameter window* are:

- **CH** (or ◀▶ *cursor keys*) selects active channel (only if LINK is OFF):  
 IN CH1 - input channel 1  
 IN CH2 - input channel 2
- **LEN** sets the DELAY length in the range 0-1240 milliseconds in 1 ms (COARSE) or 0.01 ms (FINE) steps
- **DIST** sets the distance in meters in the range 0 to approx. 430 m (delay time in LEN is computed depending on DIST and TEMP)
- **TEMP** selects the environment temperature in the range from 0 to 50 degrees Celsius with 0.5 degree step or from 32 to 121 degrees Fahrenheit with 1 degree step; the temperature unit, Celsius or Fahrenheit, can be selected in the MODE menu (F5)

By pressing MODE button you can get to the **DELAY MODE** screen which allows global setups for **DELAY** module.



The parameter you want to change can be selected with ▲▼ *cursor keys* and changed with the *parameter wheel*. After every change ENTER appears over the key F5. You need to press this button to confirm your last change. If you are not sure of proper global setup you can switch to default settings by pressing DEF (F1). EXIT (F6) allows returning to the **DELAY** screen.

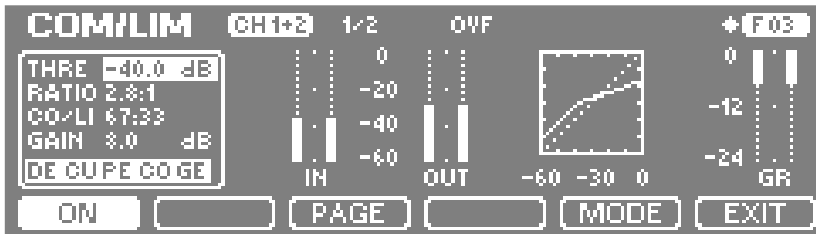
The global parameter in **DELAY MODE** screen:

- DIST UNIT selects the unit for distance adjustment: METER or FOOT
- TEMP UNIT selects the unit for environment temperature: °C or °F

Default values (after pressing DEF button):  
 METER, °C.

## Compressor/Limiter

**COM/LIM** is a unique combination of compressor and limiter intended for musical sound compressing in the mastering mode (see **CONFIG**, Page 35). It allows you a continuous fade-over between compressing and limiting functions depending on the task you want to solve. If you need to master a vocal or instrumental track you may need smoother compression, if you just want to avoid peaks in your mix you may use the limiter function more intensively.



There are five active buttons in **COM/LIM** mode:

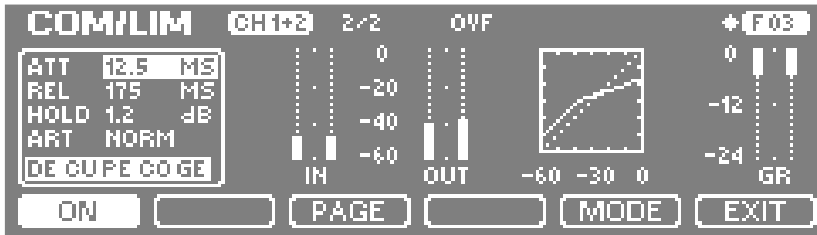
- F1** turns the **COM/LIM** ON or OFF.
- F2** toggles between CH1 and CH2 setup (only if CH LINK in MODE menu is OFF).
- F3** PAGE switches over between two different parameter sets in parameter window.
- F5** enters the MODE menu containing advanced options. (see page 22, MODE menu.)
- F6** EXIT switches back to the main SETUP screen.

**COM/LIM** parameters can be changed in the *parameter window*. Highlight the particular parameter using the **▲▼ cursor keys** and change its value with the *parameter wheel*.

**COM/LIM** parameters adjustable on the first page (see screen shot above) in the parameter window are:

- **THRE** sets up the threshold of the compressor/limiter in the range 0 to - 60 dBFs in 0.1 dB steps
- **RATIO** adjusts the grade (slope) of the compression/limiting function in the range from 1:1 to 1: 99 and INF in 0.1 (1:1 to 1: 9.9) and 1.0 (1:10 to 1: 99) steps; INF corresponds to pure limiting slope
- **CO/LI** fades over between compressor and limiter dynamic behavior in the range from 1: 99 to 99 : 1; in the setting 1: 99 the **COM/LIM** is controlled by the signal loudness, in the setting 99:1 by signal peaks; a setting in-between allows a desired combination of compressing and limiting
- **GAIN** adjusts the make-up gain in the range from 0 to -THR dB in 0.1 dB steps.

The screen shot below shows the second parameter set adjustable in the *parameter window* (selectable with F3) :



- **ATT** adjusts the attack time in the range 0.1 ms to 20 ms in 0.1 ms steps.
- **REL** adjusts the release time in the range 10 ms to 5000 ms in 10 ms steps.
- **HOLD** adjusts the hold threshold below **THR** in the range 0 to 3 dB in 0.1 dB steps.
- **ART** selects the art of the **A**utomatic **R**elease **T**ime algorithm among: OFF, LAZY, NORM, QUICK; use LAZY for symphonic music and slow instrumental solos and QUICK for very dynamic material.

The **COM/LIM** works using the so-called look-ahead algorithm that allows a very reliable limiting function. To help you in a proper setup, the **COM/LIM** screen provides the input and output level meters, limiter characteristic and the most important meter, *Gain Reduction*. In order to prevent signal distortions the *Gain Reduction* meter should normally not exceed -12 dB. If the make-up gain is at maximum and the OVF flag is flashing you should decrease the gain a little bit to avoid clipping. In addition, you can also activate the SOFT CLIP function in the **LEVELS** module (see page 28, MODE menu).

By pressing the MODE button you access the **COM/LIM** MODE screen which allows global setups for the Compressor/Limiter module.



The parameter you want to change can be selected with the ▲▼ and ◀▶ *cursor keys*, and changed with the *parameter wheel*. After every change ENTER appears in the key F5. You need to press this button to confirm your last change. If you are not sure of the proper global setup you can switch to default settings by pressing DEF (F1). EXIT (F6) allows you to go back to **COM/LIM** screen.

The global parameters in **COM/LIM** MODE screen:

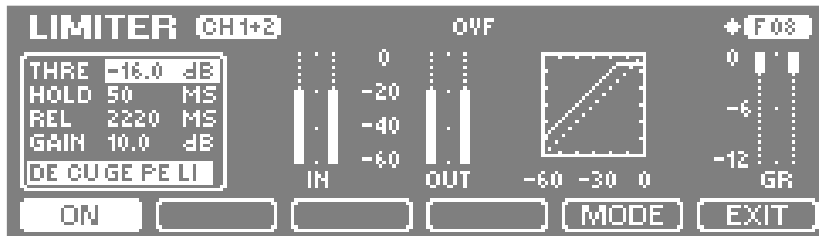
- CH LINK determines the channel coupling status:
  - switch OFF when you want to work in dual-channel mode, e.g., with two independent channels;
  - select CH1 → 2 if you want to couple the channels so CH2 takes over the setup of CH1;
  - select CH2 → 1 if you want to couple the channels so CH1 takes over the setup of CH2;
  - if both channels are coupled [CH1+2] appears in the upper status line of the **COM/LIM** screen and button [F2] stays empty.
- ST COUPL couples the limiter in both channels to avoid stereo image jumping (ON); not every kind of stereo signal is suitable to be coupled.
- CEILING activates the so called ceiling mode (ON); it allows coupling between the threshold (THR) and the make-up gain (GAIN) parameters in such way that the **COM/LIM** output stays at the same level independent on THR value; use it if you want to find the maximal possible compression degree at a given output level.
- LA DELAY selects one of the possible look-ahead delay times in the range between 0.2 and 100 ms; use short times only if the additional delay caused by **COM/LIM** module is an issue; longer LA DELAY times are recommended if you want to get very clean results when strongly compressing low-frequency signals.
- ATT COMP (Attack Time Compensation) guarantees that the attack phase surely happens within look-ahead window. Be aware that this function limits the upper range of the attack time parameter ATT to the value of the selected LA DELAY. This mode is very important if a reliable limiting function is desired.

Default values (after pressing DEF button):

CH1 → 2, OFF, OFF, 50 MS, OFF.

## Limiter

**LIMITER** is a true peak limiter intended as last stage in the reinforcement mode (see **CONFIG**, page 35). It can help you to gain some additional dB in your amplification system without overloading it or causing any clipping distortions.



There are four active buttons in LIMITER mode:

- F1** turns the **LIMITER** ON or OFF.
- F2** toggles between CH1 and CH2 setup (only if CH LINK in MODE menu is OFF).
- F5** switches to MODE menu containing advanced options (see next page, MODE menu).
- F6** EXIT switches back to the main SETUP screen.

**LIMITER** parameters can be changed in the *parameter window*. Using the **▲▼** cursor keys you can highlight the particular parameter and change its value with the *parameter wheel*.

**LIMITER** parameters adjustable in parameter window are:

- **THRE** sets up the threshold of the limiting function in the range 0 to - 48 dBFs in 0.1 steps.
- **HOLD** selects the hold time in the range 0 to 200 ms in 1 ms steps.
- **REL** selects the release time in the range 20 ms to 5000 ms in 10 ms steps.
- **GAIN** adjusts the make-up gain in the range from 0 to -THR dB in 0.1 dB steps.

The attack time of the limiter is calculated fully automatically for the absolute reliability of the look-ahead limiting function. To help in proper setup, the **LIMITER** screen provides the input and output level meters, limiter characteristic and the most important meter, *Gain Reduction*. In order to prevent signal distortion the *Gain Reduction* meter should normally not exceed -6 dB. If the make-up gain is at maximum and the OVF flag is flashing you should decrease the gain a little bit to avoid clipping. For more safety you can also activate the SOFT CLIP function in the **LEVELS** module (see page 28, MODE menu).

By pressing the MODE button you can get to the **LIMITER** MODE screen which allows global setups for the **LIMITER** module.



The parameter you want to change can be selected with the ▲▼ and ◀▶ *cursor keys* and changed with the *parameter wheel*. After every change ENTER appears in the key F5. You need to press this button to confirm your last change. If you are not sure of the proper global setup you can switch to default settings by pressing DEF (F1). EXIT (F6) allows returning to the **LIMITER** screen.

The global parameters in **LIMITER** MODE screen:

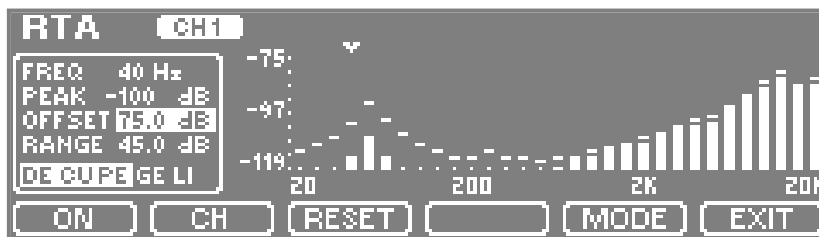
- CH LINK determines the channel coupling status:  
 switch OFF when you want to work in dual-channel mode, e.g., with two independent channels;  
 select CH1 → 2 if you want to couple the channels in the way that CH2 takes over the setup of CH1;  
 select CH2 → 1 if you want to couple the channels in the way that CH1 takes over the setup of CH2;  
 if both channels are coupled [CH1+2] appears in the upper status line of the **LIMITER** screen and button [F2] stays empty.
- ST COUPL couples the limiter in both channels to avoid stereo image jumping (ON).  
 Not every kind of stereo signals is suitable to be coupled.
- CEILING activates the so called ceiling mode (ON); it allows coupling between the threshold (THR) and the make-up gain (GAIN) parameters in such way that the **LIMITER** output is held at the same level independent on the THR setting. Use if you want to find out the maximal possible limiting degree at a given output level (maximizer function).
- LA DELAY selects one of the possible look-ahead delay times: 0.2, 0.3, 0.5, 1, 2, 3, 5, or 10 ms; longer LA DELAY times are recommended if you want to get very clean results when strongly compressing low-frequency signals.

Default values (after pressing DEF button):

CH1 → 2, OFF, OFF, 2 MS.

## Real Time Analyzer (RTA)

The Real-Time Analyzer **RTA** displays the spectrum of an input or output signal (dependent on module configuration). It is based on a 31-band filter bank spaced between 20 Hz and 20 kHz according to the 1/3-octave ISO recommendation. The **RTA** provided hold function allows building-up a spectral envelope of the analyzed signal. This envelope normalized and inverted can be used as a weighting reference for **GEQ** (see F3 in MODE menu, next page).



There are five active buttons in **RTA** mode:

- F1** turns the **RTA** ON or OFF; after OFF the last screen is frozen.
- F2** toggles between CH1 and CH2 spectrum.
- F3** RESET resets the spectral envelope.
- F5** switches to MODE menu containing advanced options (see next page, MODE menu).
- F6** EXIT switches back to the main SETUP screen.

The **RTA** parameters can be changed in the *parameter window*. Using the **▲▼ cursor keys** you can highlight the particular parameter and change its value with the *parameter wheel*. The flashing arrow points to the 1/3-octave filter band which frequency and peak value are monitored in the *parameter window*.

The **RTA** parameters adjustable or monitored in parameter window are:

- **FREQ** shows the frequency band for that the peak value is monitored in the field PEAK; it can be also selected with the **◀▶ cursor keys**.
- **PEAK** displays the peak value of currently selected frequency band.
- **OFFSET** sets up the upper range of the display: 0 - 144 dBFs in 1 dB steps.
- **RANGE** scales the range of the display related to the OFFSET: 6 – 144 dBFs in 1 dB steps.

By pressing MODE button you can get to the **RTA** MODE screen which allows some global setups for **RTA** module.



The parameter you want to change can be selected with the ▲▼ (vertically) or ◀▶ (horizontally) *cursor keys* and changed with the *parameter wheel*. After every change ENTER appears in the key F5. You need to press this button to confirm your last change. If you are not sure of the proper global setup you can switch to a typical spectrum analyzer setup by pressing DEF (F1). EXIT (F6) allows a return to the **RTA** screen.

If the unit is in the measurement mode (ME-1 or ME-2) GREF (GEQ Reference) appears over the F3 button. By pressing it you can store the current normalized and inverted spectral envelope as a weighting reference for the **GEQ** module in RE-1, RE-2, MA-1, and MA-2 mode.

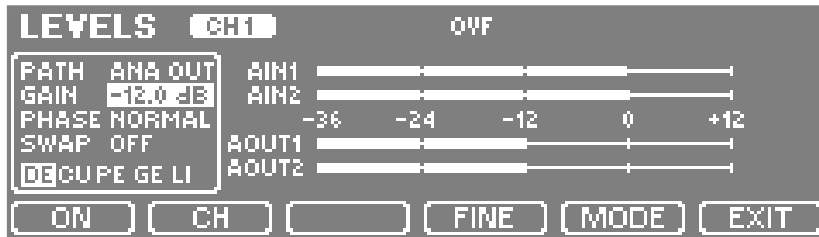
The global parameters in **RTA** MODE screen are:

- BEAMS switches the spectral beams ON or OFF; use OFF if you want to keep only the spectral envelope on the screen.
- DECAY adjusts fall-back time for the beams: 500 – 5000 ms in 10 ms steps (independent on the RANGE value in *parameter window*).
- RMS-IT selects the integration time for RMS level measurement in the range 10 ms to 20 min in 16 steps; use 50 ms for typical **RTA** function; very long integration times are intended for room characteristic measurements while impulse noise suppressing is necessary.
- SOURCE connects the spectrum analyzer either to the input or to the output of the processing chain; it allows a comparison of the signal spectrum before and after processing; in the measurement modes ME-X the **RTA** input is permanently connected to the input (ME-1) or to the output (ME-2) and therefore a dashed line - - - appears in this field.
- PEAKHOLD activates the peakhold function (ON) or deactivates (OFF).
- P-HOLD adjusts the hold time for the spectral peaks: 50 – 5000 ms in 10 ms steps; INFINITY is also possible and means that peaks do not fall back.
- P-DECAY adjusts the decay time for the spectral peaks: 500 – 5000 ms in 10 ms steps (independent on the RANGE value in *parameter window*).

Default values (after pressing DEF button):  
 ON, 1 S, 50 MS, INPUT ( - - - ), ON, 2000MS, 2000MS.

## Level Adjustment

The **LEVELS** module allows you to adjust the digital gains in the input and output paths of the system.



There are five active buttons in LEVELS mode:

- F1** turns the **LEVELS** ON or OFF; in the ON position the gains in the system are optimally adjusted for unity gain for the analog input potentiometer set up to 0 dB (see remarks at the end of page 28).
- F2** toggles between CH1 and CH2 setup (only if CH LINK in MODE menu is OFF).
- F4** changes the GAIN resolution between 1 dB (coarse) and 0.1 dB (fine); in the FINE mode the button F4 becomes inverted.
- F5** switches to MODE menu containing advanced options (see next page, MODE menu).
- F6** EXIT switches back to the main SETUP screen.

**LEVELS** parameters can be changed in the *parameter window*. Using the **▲▼ cursor keys** you can highlight the particular parameter and change its value with the *parameter wheel*. The **◀▶ cursor keys** allow a fast selection of the path.

**LEVELS** parameters adjustable in the *parameter window* are:

- **PATH** shows the active signal path (also selectable with the **◀▶ cursor keys**): analog in (ANA IN), analog out (ANA OUT), digital in (DIG IN), digital out (DIG OUT).
- **GAIN** adjusts the gain in selected path in the range from -36 dBFs to +12 dBFs in steps dependent on the resolution setup with F4: FINE 1 dB, FINE inverse 0.1 dB; do not excite 0 dB without particular reason
- **PHASE** changes the signal phase between NORMAL and INVERS; it is indicated on the display by inverting the signal label.
- **SWAP** exchanges the position of the output channels (ON); it is not active (----) for input channels; the channel swap is monitored on the screen by exchanging the position of AOUT1 and AOUT2 labels or DOUT1 and DOUT2 labels respectively.

By pressing MODE button you can get to the **LEVELS** MODE screen which allows global setups for the **LEVELS** module.



The parameter you want to change can be selected with the **▲▼ cursor keys** and changed with *parameter wheel*. After every change ENTER appears in the key F5. You need to press this button to confirm your last change. If you are not sure of the proper global setup you can switch to default settings by pressing DEF (F1). EXIT (F6) allows going back to **LEVELS** screen.

The global parameters in **LEVELS** MODE screen:

- CH LINK determines the channel coupling status:  
 switch OFF when you want to work in dual-channel mode, e.g., with two independent channels;  
 select CH1 → 2 if you want to couple the channels in the way that CH2 takes over the setup of CH1;  
 select CH2 → 1 if you want to couple the channels in the way that CH1 takes over the setup of CH2;  
 if both channels are coupled [CH1+2] appears in the *upper status line* of the **LEVELS** screen and button [F2] stays empty;  
 even in case of processing stereo signals you can switch to OFF in order to use **LEVELS** for correction of stereo balance

- CLIP selects clipping behavior at the device outputs:

HARD – hard digital clipping at 0 dBFs  
 SOFT 1 – soft clipping at 1 dB below 0 dBFs  
 SOFT 2 – soft clipping at 3 dB below 0 dBFs

Default values (after pressing DEF button):

CH1 → 2, SOFT 1

and analog levels like recommended for the input potentiometers in 0 dB position.

There are two additional help buttons HLP1, HLP2 telling you how to use **LEVELS** function properly:

HLP1 TO PREVENT ANALOG UNITY GAIN ADJUST OUTPUT LEVELS  
 ACCORDING TO THE INPUT LEVEL POTENTIOMETERS

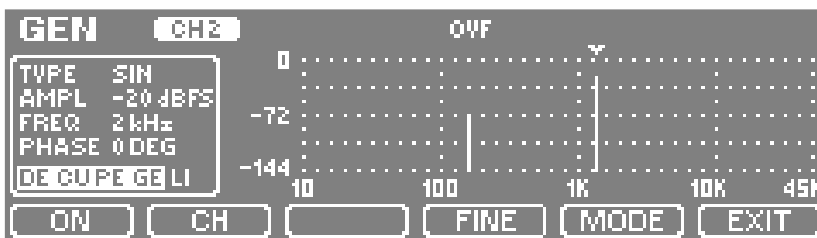
```

    -----
    INPUT POTENTIOMETER:  +12 dB    0 dB    -12 dB
    ANALOG CLIPPING LEVEL: 24 dBu   +12 dBu  0 dBu
    ANALOG OUTPUT LEVEL:  0 dBFs   -12 dBFs -24 dBFs
    
```

HLP2 DO NOT EXCEED 0 dBFs WITHOUT ACTUAL REASON.  
 IT CAN CAUSE ANNOYING DIGITAL DISTORTIONS

## Reference Generator (GEN)

The Reference Generator **GEN** is a very precise tool providing the highest-quality audio test signals. The THD+N of the generated sinus wave is better than -144 dB. For acoustical measurements uncorrelated white and pink noise is available. The signal frequency range is extended to subsonic and ultrasonic range: 10 Hz – 43.5 kHz. For hardware and digital path test some special functions have been implemented: digital constant (CONST) and up/down counting function (TRIAN). Do not use these if you are not familiar with them. They are not intended as audio signals and can damage your loudspeakers.



There are five active buttons in GEN mode:

- F1** turns the GEN ON or OFF; while OFF the generator outputs zeros.
- F2** toggles between CH1 and CH2 setup (only if CH LINK in MODE menu is OFF).
- F4** increases the adjustment resolution for frequency from 1/12 octave to 1 Hz (FINE button inverse).
- F5** switches to MODE menu containing advanced options (see page 31, MODE menu).
- F6** EXIT switches back to the main SETUP screen.

**GEN** parameters can be changed in the *parameter window*. Using the **▲▼ cursor keys** you can highlight the particular parameter and change its value with the *parameter wheel*. In addition, the **◀▶ cursor keys** allow a fast frequency adjustment in coarse (1/12 octave) steps. The position of the beams on the frequency characteristic corresponds to the selected frequency and their height to the adjusted amplitude. The flashing arrow over the frequency scale points to the chosen channel.

For the noise signals appropriate spectral envelopes are shown.

For the signals CONST and TRIAN the enlarged symbols appear in the middle of the display to warn you against non-audio signals.

**GEN** parameters adjustable in *parameter window* are:

- **TYPE** selects the type of the generated test signal: SIN (sinus), FREQ SW (sinus frequency sweep), PINK (pink noise), WHITE (white noise), CONST (digital constant), TRIAN (digital up/down counter)
- **AMPL** adjusts the signal amplitude in the range: -144 to 0 dBfs in 0.1 dB steps for 24-bit output (scales automatically to the BIT WIDTH in MODE screen: -120 dBfs for 20-bit and -96 dBfs for 16-bit output)
- **FREQ** adjusts the sinus frequency: 10 Hz – 43.5 kHz in 1/12 octave (coarse) or 1 Hz steps (fine)
- **PHASE** adjusts the relative phase of the CH2 sinus wave: 0 – 360 degrees in 1 degree steps (only if CH LINK in MODE menu is OFF); therefore for CH1 the phase is not indicated (----)

For signal type FREQ SW the *parameter window* changes to AMPL, F RAN and STEP; F RAN (frequency range) allows to switch between STAND (standard = 20 Hz – 20 kHz) and EXTEN (extended = 10 Hz – 43,5 kHz). STEP determines the sweep frequency interval: 1/3, 1/6, or 1/12 octave.

For signal types PINK and WHITE only AMPL parameter is active.

For signal type CONST the parameter AMPL changes to VALUE which can be selected from 10 typical hexadecimal constants: 000000, FFFFFFFF, 555555, AAAAAA, 7FFFFFFF, 800000, F0F0F0, 0F0F0F, CCCCCC, 333333. FREQ and PHASE are inactive.

For signal type TRAIN the *parameter window* changes to RANGE, LEN and STEP. RANGE can be set to 16, 20, or 24 bit. LEN (length) says how many samples the same value should be repeated (1 – 32), and STEP sets the digital increment (1 – 16 samples).

Do not select the signals CONST and TRAIN if you are not familiar with them. They are not intended as audio signals and can damage your loudspeakers.

By pressing MODE button, you can get to the **GEN** MODE screen that allows global setups for **GEN** module.



The parameter you want to change can be selected with the **▲▼ cursor keys** and changed with the *parameter wheel*. After every change ENTER appears in the key F5. You need to press this button to confirm your last change. If you are not sure of the proper global setup you can switch to default settings by pressing DEF (F1). EXIT (F6) allows a return to **GEN** screen.

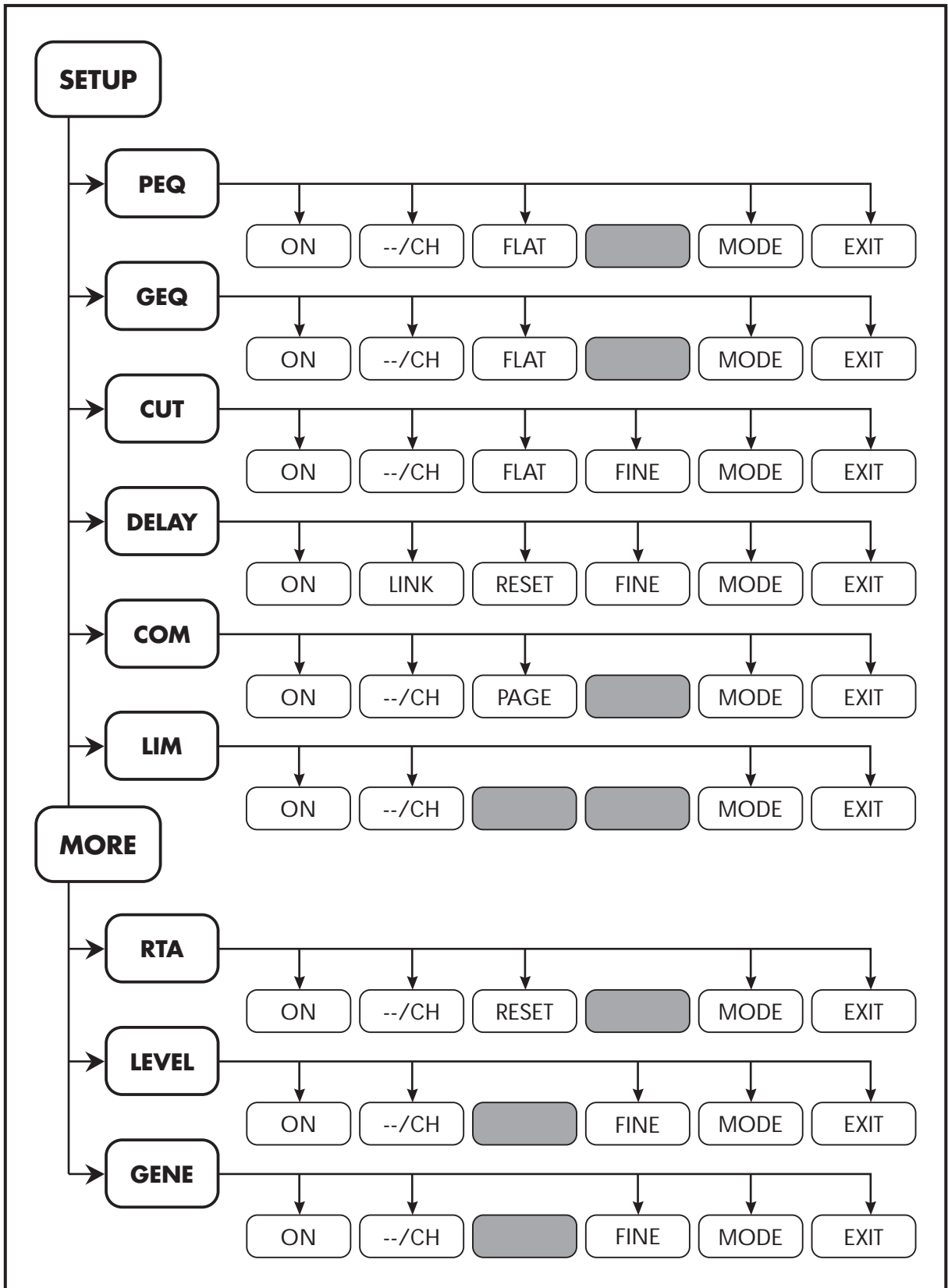
The global parameters in GEN MODE screen are mostly related to the sweep function:

- CH LINK determines the channel coupling status:  
switch OFF when you want to work in dual-channel mode, e.g., with two independent channels;  
select CH1→ 2 if you want to couple the channels in the way that CH2 takes over the setup of CH1;  
select CH2→ 1 if you want to couple the channels in the way that CH1 takes over the setup of CH2;  
if both channels are coupled [CH1+2] appears in the upper status line of the **GEN** screen  
and button [F2] stays empty
- SWEEP TYPE determines the kind of sweep: ONE-TIME switches the generator OFF after finishing sweep,  
CONT (continues) keeps sweeping as long as the generator is ON
- SWEEP DIR defines if the sweep goes from lower to higher frequencies, or vice-versa;  
a back and forth sweep is also possible
- INTERVAL sets the duration of one sweep step: 100 ms, 300 ms, 500 ms, 1s, 3s, 5s, 10s, 30s, INF;  
in the INF mode, pressing the ON button two times is the only way the next step can be performed.

Default values (after pressing the DEF button):

CH1 → 2, CONT, UP, 1 S.

## Setup Menu Structure



## Device Status

Press the UTIL button on the right side of the LCD to get into the **UTILITY** menu. The screen shows **DEVICE STATUS** and the soft keys indicate the possible functions you can enter. There are still further functions after pressing the MORE button. The **DEVICE STATUS** tells you about the actual device configuration, as well as selected audio inputs and outputs. It is very helpful if you're having any trouble with digital input/output.

DEVICE STATUS					
INPUT:	DIGI (COAX)	FSI: 44.1 kHz	WLI: - - -	SRCI: ON	
OUTPUT:	AN+DI (CON)	FSO: 48 kHz	WLO: 24 BITS	SRCO: ON	
CONFIG:	RE-1	LOCK: OFF	REMOTE: RS-232		
FS INTERNAL:	96 kHz	FSI MEASURED:	44.1 kHz		
[CONFIG]	[REMO]	[ADCAL]	[LOCK]	[ID]	[MORE]

There are six active buttons in **UTILITY** mode:

- F1** CONFIG switches to DEVICE CONFIGURATION menu that gives you control on processing module configuration and input/output selection.
- F2** REMO allows to getting into REMOTE CONTROL menu.
- F3** ADCAL switches to ADC calibration menu.
- F4** LOCK allows you to get into DEVICE LOCK menu in order to block any parameter change from the front panel.
- F5** ID shows the DEVICE ID-NUMBERS important to know in case of service or software update.
- F6** MORE switches soft keys F1-F5 to the second page of possible functions; pressing MORE again you can get to the first page; after 10 seconds an automatic change to the first page is done.

The second page covers only two functions in this software version:

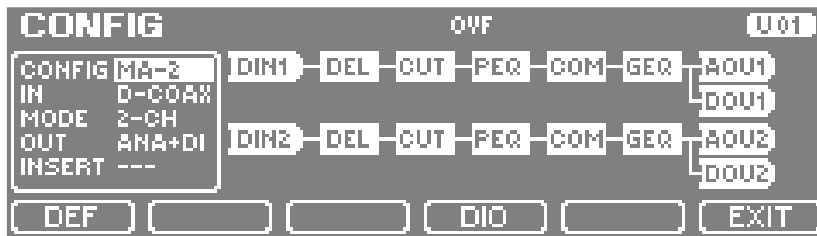
- F1** AUX opens AUXILIARY FUNCTIONS menu.
- F5** UPDT switches to the SOFTWARE UPDATE function.

The **DEVICE STATUS** screen delivers important information:

- INPUT shows the input chosen in the **CONFIG** menu; if a digital input has been selected and it is receiving valid digital audio signal the format of the incoming signal in parenthesis is shown: professional (PRO), or consumer (CON).
- FSI, WLI if a digital input has been selected and it is receiving a valid digital audio signal the sampling frequency (FSI) and wordlength (WSI) are shown as indicated in the status bits of the incoming digital signal (they are not measured, only extracted)
- SRCI tells if the input sampling rate converter is active
- OUTPUT shows the output chosen in **CONFIG** menu; if the digital output has been selected the chosen format is shown in parenthesis: professional (PRO) or consumer (CON)
- FSO, WLO if the digital output has been selected FSO shows the sampling frequency and WLO the wordlength as set up in **CONFIG** (DIO)
- SRCO tells if the output sampling rate converter is active
- CONFIG indicates the module configuration as chosen in **CONFIG** menu
- LOCK informs if the buttons and *parameter wheel* on the front panel are set locked or unlocked in the **DEVICE LOCK** menu
- REMOTE indicates the type of remote interface: RS-232, MIDI or OFF, as selected in **REMOTE** menu
- INTERNAL FS tells that the internal sampling frequency is always 96 kHz
- FSI MEASURED shows the actual sampling frequency of the signal at chosen digital input as measured by **MEQ-2000**; a result below 20 kHz indicates usually that there is no valid signal at the digital input; the FSI in the first line is indicated as declared in the status bits of the incoming signal and therefore may not agree with the actual measured frequency; it can be wrong or not indicated at all.

## System Configuration (CONFIG)

The changed configuration of the **MEQ-2000** processing modules can be optimized depending on application.



Three main setup modes are provided:

- Mastering / Recording  
with a mastering limiter/compressor being used pre or post **PEQ**
- Reinforcement  
with a reliable peak limiter implemented at the end of the chain  
to provide loudspeaker protecting function
- Acoustical Measurements  
with reference signal generator **GEN** and real-time spectrum analyzer **RTA**

The six detailed module configurations that can be chosen in *parameter window* with **CONFIG** are:

- Mastering / Recording

**MA-1** [INP>→[DEL]→[CUT]→[COM]→[PEQ]→[GEQ]→[OUT>

**MA-2** [INP>→[DEL]→[CUT]→[PEQ]→[COM]→[GEQ]→[OUT>

- Reinforcement

**RE-1** [INP>→[DEL]→[CUT]→[GEQ]→[PEQ]→[LIM]→[OUT>

**RE-2** [INP>→[DEL]→[CUT]→[PEQ]→[GEQ]→[LIM]→[OUT>

- Measurement

**ME-1** [INP>→[CUT]→[PEQ]→[GEQ]→[RTA] [GEN]→[OUT>

**ME-2** [INP>→[RTA] [GEN]→[CUT]→[PEQ]→[GEQ]→[OUT>

There are four active buttons in CONFIG mode:

**F1** DEF changes settings in the *parameter window* to a factory default setting (See below).

**F4** DIO opens a submenu for setup of the digital output.

**F5** ENTER confirms the last changes.

**F6** EXIT switches back to the UTILITY menu.

**CONFIG** parameters can be changed in the *parameter window*. Using the ▲▼ *cursor keys* you can highlight the particular parameter and change its value with the *parameter wheel*. The ◀▶ *cursor keys* have no function.

After changing any parameter in the **CONFIG** *parameter window*, ENTER appears over the F5 button. To confirm the last changes press ENTER.

Be aware about the fact that any configuration change corresponds to a new wiring of the processing modules. Therefore after ENTER a total MUTE for all outputs is always enforced. The reconfiguration takes a few seconds and in the middle of the screen a message [PROCESSING ...] temporarily appears.

Default values (after pressing the DEF button):  
RE-1, ANA, D-CH, ANA + DIG, OFF.

The parameters adjustable in *parameter window* are:

- **CONFIG** allows selection of module configuration:  
MA-1, MA-2, RE-1, RE-2, ME-1, ME-2
- **INPUT** selects the signal source:  
ANALOG / DIGITAL XLR / DIG COAX / DIG OPTO;  
if you have chosen one of the digital inputs which is not providing any valid audio signal the blinking message *\*UNLOCKED\** appears in the *upper status line* and the input is muted;  
(if you need diagnosis check UTILITY STATUS screen).
- **IN MODE** defines the configuration of the inputs:  
DUAL CH / MONO CH1 / MONO CH2 / MONO CH1+2
- **OUTPUT** selects the output mode:  
ANALOG / DIGITAL / ANA + DIG  
in DIGITAL mode all three outputs (XLR, COAX, OPTO) deliver the same audio signal simultaneously
- **INSERT** allows you to break the processing chain and connect an external insert device to the not used pair of input/output (not possible if OUTPUT is set to ANA + DIG).



**INSERT** field is related to the chain of modules selected in **CONFIG** field and indicates the break point being after selected module. In the example screen above **INSERT** is digital/digital and located between the **GEQ** and **PEQ** modules. The example screen below describes the same **INSERT** location, but this time using analog input and output. Mixed configurations analog/digital and digital/analog are also possible for **INSERT** if the input/output configuration in **IN** and **OUT** fields is complementary mixed.



Be aware that after insert confirmation, a total mute will be introduced on all audio outputs; switch to OFF if you do not want to use any inserts; in another case the signal chain stays broken and you have no signal at the output.

If you are not sure of your **CONFIG** setup press F1 button (DEF) to get into standard factory setup: reinforcement mode (RE-1), input analog, dual channel (2-CH), output analog + digital, insert OFF, digital output 48 kHz (see DIO menu).

The DIO submenu allows detailed setup of the digital output and the digital synchronization input independent on whether they are active or not.



You can set up five parameters for the digital output:

- DO MODE selects digital output format: professional (AES-3 or AES/EBU) or consumer (SPDIF)
- DO FS selects the output sampling frequency among 32, 64, 88.1, and 96 kHz as well as FSIN1 and FSIN2;

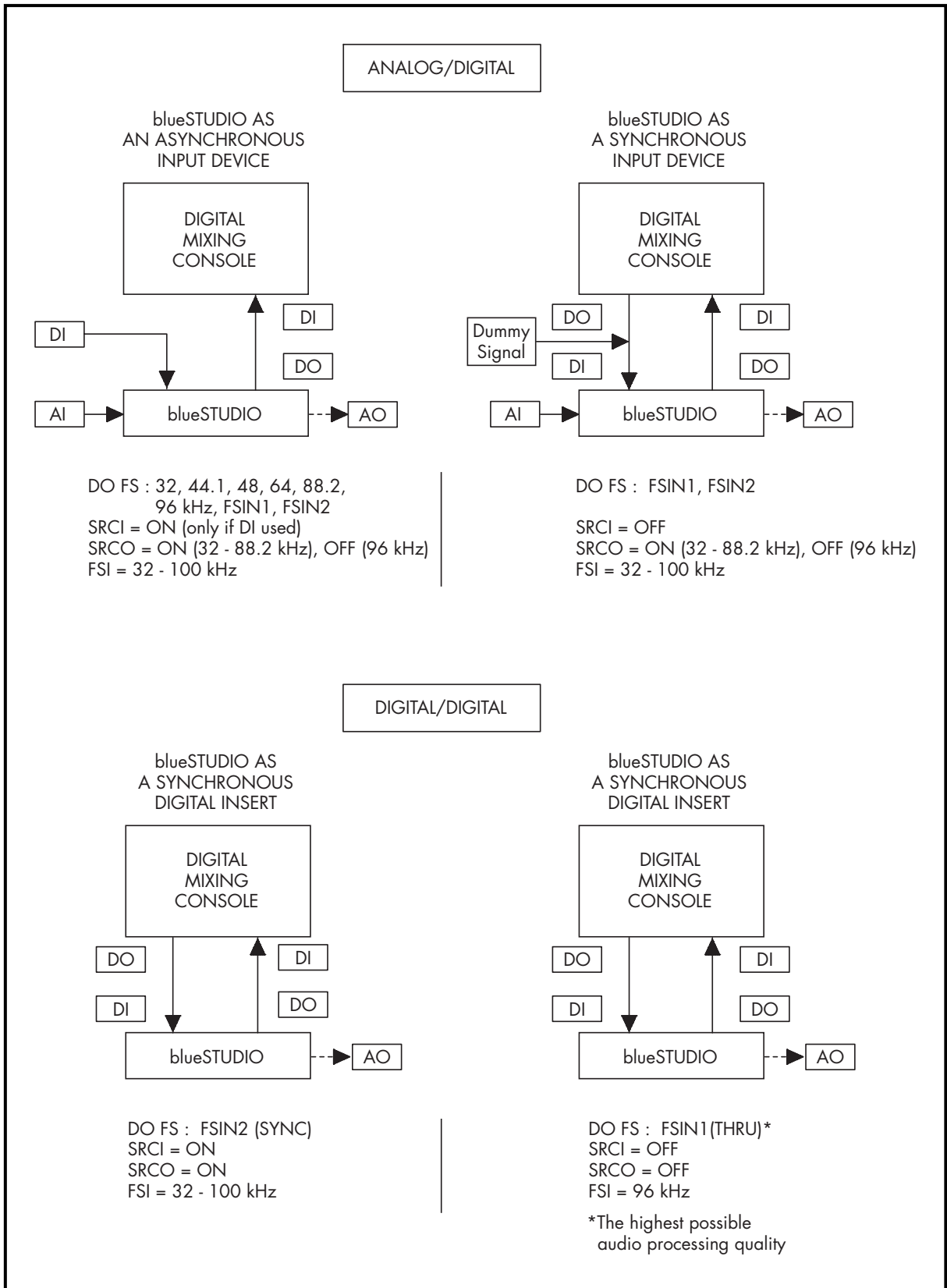
FSIN means that the sampling frequency of the digital input is passed to the digital output. In the FSIN1(THRU) mode the system checks first if the digital input frequency is close to 96 kHz. If yes the sampling rate converters are switched off to allow the highest possible processing and transmitting quality. This mode is recommended if MEQ-2000 is used in a chain after other units of the **DSP-2000** family. The FSIN2(SYNC) mode is recommended if you want to synchronize your MEQ-2000 to the studio clock or a digital mixing console over the digital input. If you want to use analog input and digital output synchronized to your digital mixer just connect a dummy digital signal to the digital input selected in DI SELECT and choose FSIN2(SYNC) mode in DO MODE field. The same procedure is necessary when you apply your **MEQ-2000** as an insert device using digital IN and OUT.

- DO WL selects the word lengths among 24, 20, and 16 bits; decreasing the word lengths makes sense only if you need to cut the output signal to a final format, e.g., to 16-bit CD; in this case a proper dithering can be switched on in the field DITHER
- DITHER switches ON and OFF the dither function at the Output Sampling Rate Converter
- DI SELECT selects the word lengths among 24, 20, and 16 bits

After changing any parameter in the DIGITAL IN OUT window, ENTER appears over the F5 button. To confirm the last changes press ENTER. Be aware about the fact that any input/output change corresponds to a new wiring of the interface modules. Therefore, after ENTER a total MUTE for all outputs is always enforced. The reconfiguration takes a few seconds and is confirmed by empty F5 button (ENTER disappears).

Default values (after pressing the DEF button):  
 PROF (AES-3), 48 kHz, 24 BITS, ON, D-XLR.

# Typical Digital Interconnections



## Remote Control

The **MEQ-2000** can be remotely controlled via RS-232 or MIDI interface. It allows applying **MEQ-2000** in large centrally controlled installations. To control the device you can use any programmable remote software or a hardware MIDI controller. The list of possible commands and messages is included in Appendix I.

If you use an **Algorithmix/INTER-M** proprietary remote software (**DSP-2000R**) you have an excellent visual control of the **MEQ-2000** processing functions on the computer monitor and fully bi-directional communication. So you can change the parameters either in **MEQ-2000** itself or via PC software. Especially convenient is to blow up the real-time analyzer on the PC screen.

In the future, after the **DSP-2000** family has become new members, a multidevice remote software will be delivered. Then the devices can be cascaded using RS-232 or MIDI interface.



There are three active buttons in REMOTE mode:

- F1** DEF recalls a default setup (see below).
- F5** ENTER appears only after you have changed a parameter; press this button to confirm last changes.
- F6** EXIT switches back to the main UTILITY screen.

The selectable parameters in **REMOTE** screen are:

- **REMOTE** selects RS-232 or MIDI interface
- **BAUD RATE** selects the transmission rate for the communicating with the PC (only if RS-232 is chosen); be aware about setting both transmission rates in the **MEQ-2000** and in your PC to the same value; set the BAUD RATE as high as possible to guarantee less latency in case if you display the RTA on the PC screen; if you have problems getting free-of-errors connection (because of long, or low-quality cable) decrease the BAUD RATE respectively
- **SOFTTHRU** says if the remote control input stream has to be conveyed to the THRU connector for RS-232 interface or to the OUTPUT connector in case of MIDI interface
- **MIDI CH** selects the MIDI channel for receiving the MUTE and BYPASS commands and for transmitting the **RTA** real-time data to remote.

Default values (after pressing the DEF button):

RS-232, 115.2 kBits/S, OFF, 0.

## ADC Calibration

If you use analog input and want to get maximum audio quality, you may calibrate the analog-to-digital converter 30 minutes after switching on or shortly before an important session.

Normally the ADC is calibrated automatically after switch-on. During warming up, however, a small drift of the input signal range may occur. To compensate it a recalibration is recommended, especially if your source has a wide dynamic range close to the specified signal-to-noise ratio of the **MEQ-2000**.



After pressing ADCAL in **UTILITY** menu you get to the above screen. To start ADC calibration you need to press CAL. The calibration process is very fast, no longer than 1 second. Thereafter the message ADC CALIBRATED appears. To go back to UTILITY menu press EXIT. After 10 seconds an automatic exit is done in any case. If you want to leave this menu without recalibrating ADC just press EXIT. Be aware that total system mute always precedes the calibration process.

## Device Security Lock

In order to protect the current device setup against accidental changes caused by pressing any button or turning the *parameter wheel*, during an important event or to avoid undesirable access by unauthorized persons, a device lockout function is provided.

There are two stages of security: an easy lock/unlock function and a password protected lock/unlock function.



After getting to **SECURITY LOCK** function by pressing LOCK button in **UTILITY** menu the parameter DEVICE in the first line is highlighted. You have three possibilities that can be selected with the *parameter wheel*: EASY LOCK, PWD LOCK, and UNLOCK. If you have chosen EASY LOCK, and afterwards hit F5 (ENTER) button any parameter change is prevented. You can still switch among the menus but after trying to readjust any parameter a window with the message DEVICE LOCKED appears over the actual menu screen for a few seconds and all parameters remain unchanged.

To unlock the device you have to enter the **SECURITY LOCK** menu and select with the *parameter wheel* DEVICE: UNLOCK and finally press F5 (ENTER). The parameter adjustment becomes possible again.

If you want to protect your device with a password select DEVICE: PWD LOCK and confirm by pressing F5 (ENTER). The first position of the password is highlighted. Using the *parameter wheel* select the first character and hit ► *cursor key* to switch to the next position. After entering all five characters press ENTER to lock the device. If you want to unlock a password locked **MEQ-2000**, press LOCK in **UTILITY** menu. The first password position is highlighted. Enter the correct password as described above and hit F5 (ENTER) button to unlock the device.

If you have forgotten your password, you may always gain access to your **MEQ-2000** controls by continuously pressing F1 two minutes long. Don't tell it to other people!

## Device ID-Numbers

After pressing the ID button in **UTILITY** menu you can get to information uniquely identifying your **MEQ-2000**. You need these numbers before contacting technical support, or if you want to download a software update or special software plug-ins.



**F6** allows you to switch back to the **UTILITY** menu. After 20 seconds an automatic exit is provided in any case.

## Auxiliary Functions

After pressing the AUX button in **UTILITY** menu you can access some global settings.



There are two parameters selectable in **AUXILIARY** screen with the ▲▼ cursor keys:

- BACKLIGHT provides you with the possibility for an automatic LCD backlight switch-off after 1, 3, or 5 minutes; of course you can keep the backlight always on (select ON), however it's highly recommended to use automatic switch-off in order to increase the life period of the EL backlight
- RELAYS parameter selects the device power-on and power-off sequence depending on the mode chosen for the relays at the analog outputs; they can be configured as HARD BYPASS (default) recommended for reinforcement, or as HARD MUTE preferred in mastering studios  
Be aware that this parameter is allowed to be changed **ONLY** after the hardware jumpers described in the Appendix II have been properly set up. Therefore it is highly recommended to delegate this modification to an authorized dealer.

Every parameter change needs to be confirmed with **F5** (ENTER).

**F6** (EXIT) allows you to switch back to the **UTILITY** menu. After 20 seconds an automatic exit is provided in any case.

## Software Update

The hardware architecture of the **MEQ-2000** allows later software updates via the RS-232 interface. Therefore, you can easily participate in future technological improvements and additional functionality.



The software update should normally be done only by authorized distributors.

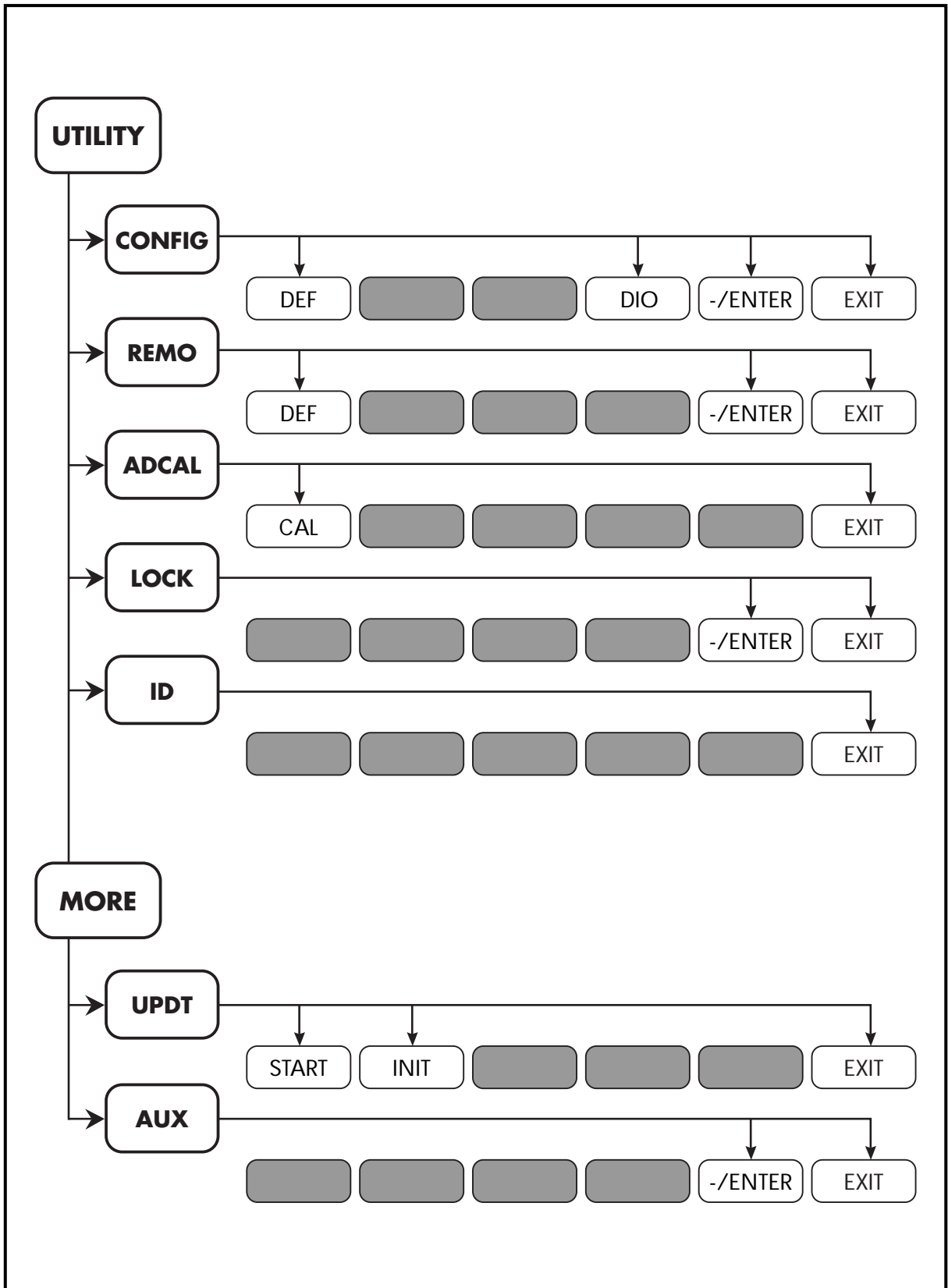
To do an update, special software should be first installed on a PC. It is available at the **Inter-M** ([www.inter-m.com](http://www.inter-m.com)) or **Algorithmix** ([www.algorithmix.com](http://www.algorithmix.com)) web page. Also the newest **MEQ-2000** operating software version can be downloaded there. Compare the current software version installed in your **MEQ-2000** with the version number available at the Internet. The currently installed software version number can be viewed in the opening screen after device switch-on or in the **ID-NUMBERS** window.

After connecting the **MEQ-2000** serial port interface (RS-232 IN) to a serial port (RS-232) of the PC the **MEQ-2000** should be switched to the UPDATE mode and the download software on the PC started. The further steps are explained by messages accompanying the download procedure.

To avoid any **device damage** or **operating system lose** ask your distributor for detailed information how to get and install an update!

The INIT button begins the initialization of the preset memory and therefore **deletes all user presets!** Be aware about that and use this feature only if you want to reset all your previous presets. The factory presets are not touched by the INIT button.

## Utility Menu Structure



## Memory Menu

Any momentary selected setup of every processing function included in **SETUP** menu can be stored as a user preset for later use. In general, there are two kinds of storing your presets: temporary and permanent. Temporary presets handled directly by the PR1 and PR2 buttons on the front panel are very helpful if you need to compare quickly up to three setups (PR1, PR2, and actual setup). Permanent presets are recommended if you want to store them for future use. Anytime later you can recall them in addition to the standard factory presets by using **MEMORY** menu.

The **MEMORY** menu can be easily called from every processing function by pressing the **MEMORY** button placed at the right side of the display.



The picture above shows the situation after the **MEMORY** button has been pressed while the **GEQ** was on the screen. It opens the *memory window* with the last used preset highlighted.

There are four active buttons in MEMORY mode:

- F1** FACT/USER toggles between the FACTORY and the USER preset bank calling the window with respectively factory (Fxx) or user (Uxx) preset list.
- F2** RECALL loads the highlighted preset and overwrites the current setup; if you want to keep the last setup you can use temporary presets PR1 or PR2 before you make RECALL.
- F4** DELETE allows removing the highlighted preset from the USER bank.
- F5** STORE enters the store menu; it appears only if USER bank is chosen.
- F6** CANCEL allows you to switch back to the current processing function without storing/recalling any preset.

The buttons F4 (DELETE) and F5 (STORE) are active only when USER bank has been chosen by F1.

For every processing module (**PEQ**, **GEQ**, **CUT**, **DELAY**, **LIMITER**, **COM/LIM**) eight factory presets (FACT) are delivered as a good starting point for your own settings. They cannot be deleted nor overwritten, but you may store up to 32 presets per processing module in USER bank. The first two position of the USER bank are dedicated for temporary presets stored by using the quick preset buttons PR1 and PR2.

After you have loaded a factory or user preset, its number appears in the screen of the processing module in the right upper corner (e.g., F04 or U23). As soon as you readjust any parameter a ♦ sign is added in the front of the preset number. It says that the current setting is originated from the displayed preset number, but already modified.

Using the ▲▼ *cursor keys* or *parameter wheel* you can select any memory position in USER or in FACTORY bank. After you have selected FACTORY bank you can only recall presets (F4 and F5 are empty). If you have selected USER you can store your current setup (see later) or delete a highlighted user preset.

The first position in FACTORY bank (F01) for every processing module is recommended as a kind of default and neutral setup being a good starting position for creating new presets.

The first two positions in USER bank are associated with the temporary preset buttons PR1 and PR2, but they can be also overwritten or recalled directly from MEMORY menu.



The screen above says that the last recalled preset was F01: FLAT(INT). With the F1 button USER bank has been called and with the *parameter wheel* empty preset U04: --- has been chosen. Now we want to store the last **GEQ** setup at the position U04. Therefore we press STORE button and open the window that allows entering a new preset name.



The soft keys F1 – F6 get new temporary meaning:

- F1** NEW deletes the old name completely and brings the cursor to the first position
- F2** INSERT allows to insert a letter between others already existing  
(use the ◀▶ *cursor keys* to chose the desired position)
- F3** BS introduces back space
- F4** DEL deletes the current position
- F5** STORE confirms the preset name and switches back to the current processing function screen
- F6** CANCEL switches back to the current processing function without storing the last setup

By using the function keys described above and the *parameter wheel* to select the alphanumeric characters, you can easily enter new names or correct existing names. A preset name can consist of up to 16 characters. Using the ◀▶ *cursor keys* you can jump to the next position in the preset name and enter the next character, or to any previous position and delete, insert or change an existing character. To speed up scrolling through the characters a fast jump to numbers or letters is possible with the ▲▼ *cursor keys*.

If you want to *overwrite* an already existing user preset you will be asked if you really want to do this. You need to confirm with YES or go back to the preset window in order to select a free preset location. The factory presets cannot be overwritten.

You can *copy* presets by recalling and storing them in another location with old, modified, or new name.

Any user preset can be deleted by pressing DEL (F4) button in **MEMORY** menu.

For your convenience there are two direct temporary preset buttons on the right side of the *parameter wheel* called PR1 and PR2. They are very helpful if you quickly want to compare up to three different setups of the same functions without mute and any annoying sound distortions. After you have found out first interesting setup press MEMORY and afterwards PR1 (or PR2) button. Now you can modify your current setup and store the new adjustment pressing MEMORY and afterwards the PR2 (PR1) button. If the PR1 or PR2 contains the setup being on the screen the LED inside of the respective button is lightning. Now you can again change the setup (the temporary preset LED switches OFF). Switching ON and OFF the buttons PR1 and PR2 (the PR1 and PR2 toggle) you can easily compare between three setups, without using the MEMORY button: two stored in temporary presets and the last one on in the current LCD screen. If you correctly follow the FLAT / UNDO rules you can even switch among three setups and FLAT for **GEO**, **PEQ** and **CUT** functions.

In the UTILITY group you can make presets regarding to the **MEQ-2000** configuration and general setup. In the **CONFIG** menu you can recall eight typical module and in/out configurations stored in the FACTORY bank. Of course, you can also store your own **CONFIG** settings (up to eight).

**MEQ-2000** also provides so called Global Presets which include the complete setup of the whole unit. They can be recalled after pressing UTILITY and MEMORY buttons. At the moment there are two factory presets stored: GENERAL DEFAULT and MEASUREMENT1. The first one corresponds to the default application setup that is downloaded in the factory before shipment. The second preset is recommended to recall before starting audio performance measurements. It takes care of transparent setting of all parameters (processing OFF, nominal levels, and soft clip OFF). In the USER bank there are four positions for individual Global Presets. They are especially advantageous if the **MEQ-2000** is used by a few persons; everyone can create his own global setup corresponding to his basic setting. Note that in Global Presets the entire device configuration is stored, inclusive modules which have no individual presets, e.g., **LEVELS**.

After you have loaded a factory or user global preset, its number appears in the screen of every processing module in the right upper corner (e.g., GF1 or GU3). As soon as you readjust any parameter a ♦ sign is added in the front of the preset number. It says that the current setting is originated from the displayed preset number, but already modified.

## Technical Specifications

### SIGNAL PROCESSING FUNCTIONS (per channel)

- Full Parametric Equalizer
  - Eight High-Precision Digital Filters: Low Shelving, 6 x Constant-Q Bell, High Shelving
  - Shelving Slope: 3, 6 or 9 dB/octave
  - Extended Frequency Range: 20 Hz to 40 kHz
  - Bandwidth: 1/12 to 2 Octaves
  - Boost/Cut Range:  $\pm 16$  dB or  $\pm 8$  dB
- Graphic Equalizer
  - 31 Constant-Q Filters on 1/3-Octave musically divided center frequencies
  - Bandwidth: 1/3, 2/3, or 1/6 octave
  - Boost/Cut Range:  $\pm 16$  dB or  $\pm 8$  dB
  - Filter Bank Type: Parallel, Interpolating
- Cut Filter Block
  - Low-Cut and High-Cut Filters
    - Low-Cut Frequency Range: 2 Hz to 2 kHz
    - *suitable for DC-Removal and De-Rumble*
    - High-Cut Frequency Range: 200 Hz to 25 kHz
    - Slope: 6, 12, 18 dB/octave
    - Characteristics: Bessel, Butterworth
  - Notch Filters
    - Six High-Precision Digital Filters
    - Frequency Range: 20 Hz to 20 kHz
    - Frequency Resolution: 1 Hz
    - Q: 15, 30, 45, 60
    - Range: +8 to -24dB
- Limiter/Compressor (in mastering mode)
  - Unique Combination of a Limiter and Compressor  
*smoothly adjustable between limiting and compressing function*
  - Adaptive Knee
  - Threshold: 0 to - 60 dBFs
  - Ratio: 1:1 to inf:1
  - Attack Time: 0.1 to 200 ms
  - Hold Hysteresis: 0 to 3 dB
  - Release Time: 20 to 5000 ms
  - Look-Ahead Delay: 0.2, 0.5, 1, 2, 5, 10, 25 ms
  - Program-Dependent Auto-Release Function
  - Make-Up Gain
  - True Stereo Coupling
  - Sophisticated Metering: Input, Output, Gain Reduction

- Peak Limiter (in reinforcement mode)
  - Brick-Wall Function
  - Threshold: 0 to -48 dBFs
  - Auto-Attack for Reliable Peak-Stop Function
  - Hold Time: 0 to 200 ms
  - Release Time: 20 to 2000 ms
  - Make-Up Gain
  - True Stereo Coupling
  - Sophisticated Metering: Input, Output, Gain Reduction
  
- Master Delay
  - Length: 2 x 1240 ms
  - Resolution: 0.01 millisecond
  - Programmable in milliseconds, meters or feet  
(the actual environment temperature can be considered)
  
- Digital Output Level Attenuation and Requantization with Dither
  - Attenuation: 0 to -24 dBFs
  - Phase Invert & Channel Sweep
  - Dithering Levels: 16, 20, 24 bits
  
- 1/3 Octave Real-Time Spectrum Analyzer
  - 31-Band conform to GEQ
  - Peak-Hold Function with Reset
  - Adjustable Averaging and Decay Time
  - Adjustable Display Range: Maximal Level and Zoom
  - Inverse Spectral Function as a reference for GEQ
  
- Reference Signal Generator
  - Waveforms: Sine, Sine Sweep
  - Noise: White, Pink
  
- Manual Feedback Detection and Suppression
  
- Room Measurement and Correction

- Comprehensive Sample Rate Conversion:
  - Input Sample Rates: 20 – 100 kHz
  - Output Sample Rates: 32, 44.1, 48, 64, 88.2, 96 kHz, or equal to the Input Sample Rate
- Detailed Digital I/O Status Monitoring
  - AES-3 (AES/EBU) conform
  - IEC958 (S/PDIF) conform
- Configuration Modes
  - Mastering / Reinforcement
  - Acoustic Measurements
- Hard Bypass (switchable to Hard Mute with jumpers)

## AUDIO INPUTS AND OUTPUTS

### Analog Inputs:

- XLR (pin 2 hot) electronic balanced, RF suppressed
- Impedance: > 10 kOhms (balanced)
- Maximal Signal Level: +24 dBu (Input Gain @ +12 dB)
- Input Gain Range (potentiometer adjusted): -12 dB to +12 dB

### Digital Inputs:

- XLR: AES-3 or AES/EBU (up to 24 bits) transformer balanced
- Coaxial and Optical: S/PDIF (up to 20 bits), IEC 958, EIAJ CP-340 coax with transformer
- Sample Rate: 20 to 100 kHz (any)

### Analog Outputs:

- XLR (pin 2 hot) electronic balanced, RF suppressed
- Impedance: 100 Ohms
- Maximal Signal Level: +24 dBu @ 600 ohm
- Output Level Gain: 0 to -24 dBFs (digitally adjusted)

### Digital Outputs:

- XLR: AES-3 or AES/EBU (up to 24 bits) transformer balanced
- Coaxial and Optical: S/PDIF (up to 20 bits), IEC 958, EIAJ CP-340 coax with transformer
- Sample Rate: 32 kHz, 44.1 kHz, 48 kHz, 64 kHz, 88.2 kHz, and 96 kHz

### AUDIO PERFORMANCE

- Digital Processing: A/D conversion: Sigma-Delta, 24-bit, 96 kHz  
D/A conversion: Sigma-Delta, 24-bit, 96 kHz  
Digital In/Out: 24-bit, 32 to 96 kHz  
Internal Sampling Frequency: 96 kHz (always)  
Calculation Resolution: up to 80 bits  
Internal Signal Path: 40 bits  
Inherent System Delay: < 1 ms @ 96 kHz  
(between any input and output)
- Analog Input: Frequency Range: 10 Hz – 31.5 kHz, 0/-0.5 dB  
Dynamic Range: > 113 dB(A), THD+N: 0.001% (10 Hz – 31.5 kHz)  
Crosstalk: < -105 dB @ 1 kHz, CMRR: > 40 dB @ 1 kHz
- Analog Output: Frequency Range: 10 Hz – 31.5 kHz, 0/-0.3 dB  
Dynamic Range: > 115 dB(A), THD+N: 0.0015% (10 Hz – 31.5 kHz)  
Crosstalk: < -105 dB @ 1 kHz, CMRR: > 40 dB @ 1 kHz
- Digital In/Out: Frequency Range: 10 Hz – 44 kHz, 0/-0.2 dB @  $F_s = 96$  kHz  
Dynamic Range: > 124 dB(A), THD+N: 0.0005% (10 Hz – 40 kHz) @ 88.2 kHz

### MEMORY

- 64 Factory and 128 User Presets
- 2 Temporary Presets for fast setup comparison

### REMOTE INTERFACE

- MIDI: In, Thru, Out
- RS: 232: In, Thru

### POWER REQUIREMENTS

- 100 – 120 V, 200 – 240 V, 50 or 60 Hz, 25 W

### DIMENSIONS:

- 19" 2U Rack, 482(W) x 88(H) x 300(D) mm/19(W)x3.5(H)x11.8(D)in

### GENERAL:

- Password Protection with Alphanumeric Key
- Weight: 7kg/15.4lb

*Due to continuing improvements of our products, we secure us the right to change these specifications without prior notice.*

## Limited Warranty

All exported products are subject to warranty and services to be specified and provided by the authorized distributor for each country.

In Korea **INTER-M** warrants this product to be free from defects in material and workmanship for a period of one (1) year from the date of purchase PROVIDED, however, that this limited warranty is extended only to the original retail purchaser and for causes arising out of defects in material or workmanship.

Defects caused by unauthorized modifications, misuse, negligence, accidents, or any use of this product that is not in accordance with the instructions provided in this manual are not covered by this warranty.

## APPENDIX I : Algorithmix/InterM System-Exclusive Message Definition

### General Structure

Byte	Data	Description
0	F0h	Start of System Exclusive Message
1	00h	Manufacture Id
2	20h	European Group
3	49h	ALGORITHMIX ID-Code
4	ii	Model Id.      00 = All Models 01 = MEQ-2000 (DSP blue)
5	nn	....
5+n	F7h	End of System Exclusive Message

### Function Groups for Device Id. "All MODELS"

#### Header

Byte	Data	Description
0	F0h	Start of System Exclusive Message
1	00h	Manufacture Id
2	20h	European Group
3	49h	ALGORITHMIX ID-Code
4	ii	Model Id.      0x00 = All Models
5	hh	Handle          0x00 = No Handle
6	xx	Command ID    0x00 = Request Device Info (Receive) 0x01 = Set Device Id (Receive) (device dependent) 0x02 = Request Device Status (Receive) 0x40 = Device Info (Send) (device dependent) 0x41 = Device Status (Send) (device dependent) 0x42 = Busy Status (Send)

#### Request Device Info (Receive)

Byte	Data	Description
6	00h	Command ID
7	F7	End of System Exclusive Message

#### Set Device Id (Receive)

Byte	Data	Description
6	01h	Command ID
7..22	rr	Device Serial Number
23	uu	Device ID
24	F7	End of System Exclusive Message

#### Busy Status (Send)

Byte	Data	Description
5	hh	Handle
6	42h	Command ID
7	bb	BusyStatus
8	F7	End of System Exclusive Message

## Device Info (Send)

Byte	Data	Description
5	hh	Handle
6	40h	Command ID
7	vv	Model Id of connected Device
8	vv	Software Version Byte 1    1 = 1.        n = n.x
9	vv	Software Version Byte 2    0 = 0.x        n = x.n
10...25	rr	Device Serial Number Hardware
26...33	rr Device Serial Number Hardware Device Serial Number Hardware	Device Serial Number Software
34	F7	End of System Exclusive Message

## Function Groups for Device Id. "MEQ-2000/DSPblue"

Byte	Data	Description
0	F0h	Start of System Exclusive Message
1	00h	Manufacture Id
2	20h	European Group
3	49h	ALGORITHMIC ID-Code
4	ii	Model Id.                    01 = MEQ-2000/DSPblue
5	uu	Device Id./ Handle.        00 = All Devices/No Handle
6	gg	Function 0x00 = GEQ 0x01 = PEQ 0x02 = CUT 0x03 = COM/LIM 0x04 = Delay 0x05 = RTA 0x06 = BUTTONS 0x07 = LIM 0x08 = LEVELS 0x09 = GEN 0x0A = CONFIG 0x7A = INFO 0x7B = System 0x7C = FTP 0x7E = Debug
7	nn	Parameter to follow
8	pp 1	Parameter Id.
9	vv 1	Parameter Value (number of bytes depends on Parameter Id.)
..	...	
n+0	pp n	Parameter Id.
n+1	vv n	Parameter Value (number of bytes depends on Parameter Id.)
n+2	F7h	End of System Exclusive Message

**MEQ-2000 Parameter Identifier for GEQ (Graphic Equalizer)**

## GEQ Master Gain

Byte	Data	Description
0	01h	Id. GEQ Gain
1	cc	Channel 0=Ch1, 1=Ch2
2	gg (MSB)	Gain -16dB to +16dB
3	gg (LSB)	in +/- 0.01 dB steps (0 = 0x2000)

## GEQ Band Gain (update for all 31 bands)

Byte	Data	Description
0	02h	Id. GEQ-Bands
1	cc	Channel 0=Ch1, 1=Ch2
2	bb (1) MSB	Level Band 1 -16dB to +16dB,
3	bb (1) LSB	in +/- 0.01 dB steps (0 = 0x2000)
4	..	....
5	bb (31) MSB	Level Band 31 -16dB to +16dB,
6	bb (31) LSB	in +/- 0.01 dB steps (0 = 0x2000)

## GEQ Range

Byte	Data	Description
0	03h	Id. GEQ Range
1	rr.	0 = +/-8dB, 1 = +/-16dB

## GEQ ON/OFF

Byte	Data	Description
0	04	Id. GEQ ON/OFF
1	oo	0 = off, 1 = on

## GEQ Channel Link

Byte	Data	Description
0	05h	Id. GEQ Channel Link
1	ll	0 = off, 1 = on

## GEQ Band Gain (seperately for each Band)

Byte	Data	Description
0	07h	Id. GEQ Level for one Band
1	cc	Channel 0 = Ch1, = Ch2
2	bb	Band 0-30
3	ll (MSB)	Level -16dB to +16dB,
4	ll (LSB)	in +/- 0.01 dB steps (0 = 0x2000)

## GEQ Type

Byte	Data	Description
0	08h	Id. GEQ Type
1	tt	Type 0 = Interpolated, 1 = Parallel

## GEQ Weighting

Byte	Data	Description
0	09h	Id. GEQ Weighting
1	ww	Weighting 0 = Off, 1 = RTA, 2 = MGEO

## GEQ Reference (relevant only for proper LCD update)

Byte	Data	Description
0	0Ah	Id. GEQ Reference
1	ww	Reference 0 = Hide, 1 = Show

## GEQ Load Preset

Byte	Data	Description
0	0Ch	Id. GEQ Load Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp, 2 = Factory

## GEQ Save Preset

Byte	Data	Description
0	0Dh	Id. GEQ Save Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## GEQ Delete Preset

Byte	Data	Description
0	0Eh	Id. GEQ Delete Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## GEQ Preset Name

Byte	Data	Description
0	0Fh	Id. Preset Name for GEQ-Preset
1	cc	Character 1
	...	...
16	cc	Character 16

## GEQ Dirty (Receive)

Byte	Data	Description
0	10h	Id. GEQ Dirty
1	fi	Function Group Id. 0x00
2	mi	Menu Id.

**MEQ-2000 Parameter Identifier for PEQ (Parametric Equalizer)**

PEQ Master Gain

Byte	Data	Description
0	01h	Id. PEQ Gain
1	cc	Channel 0=Ch1, 1=Ch2
2	gg (MSB)	Gain -16dB to +16dB, in +/- 0.01 dB steps ( 0 = 0x2000)
3	gg (LSB)	

PEQ Filter

Byte	Data	Description
0	02h	Id. PEQ Band
1	cc	Channel 0 = Ch1, 1 = Ch2
2	bb	Filter 0-7 0 = LS , 1 = HS, 2-7 = Bell
3	tt	0x7F
4	ff (MSB)	Frequency 10.0Hz – 25.0kHz (3 Bytes in 0.05 Hz steps) (10.0Hz = 0x0000C8)
5	ff	
6	ff (LSB)	
7	ww (MSB)	Bandwidth (Q) 0.667 to 20.0 in 0.01 steps  If MSB = 0x7F then Bandwidth in octaves in LSB 0 = 2, 1 = 3/2, 2 = 1, 3 = 2/3, 4 = 1/2, 5 = 1/3, 6 = 2/9, 7 = 1/6, 8 = 1/9, 9 = 1/12 for Filter 2 to 7 0 = 3dB/Oct, 1 = 6dB/Oct, 2 = 9dB/Oct for Filter 0 and 1
8	ww (LSB)	
9	gg (MSB)	Gain -16dB to +16dB, in +/- 0.01 dB steps (0 = 0x2000) 0 = off for Slope equivalent to Gain = 0x2000
10	gg (LSB)	

PEQ Range

Byte	Data	Description
0	03h	Id. PEQ-Range
1	rr	Range 0 = +/-8dB, 1 = +/-16dB

PEQ ON/OFF

Byte	Data	Description
0	04h	Id. PEQ ON/OFF
1	oo	0 = off, 1 = on

PEQ Channel Link

Byte	Data	Description
0	05h	Id. Channel Link
1	ll	0 = off, 1 = on

## PEQ Load Preset

Byte	Data	Description
0	0Ch	Id. PEQ Load Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp, 2 = Factory

## PEQ Save Preset

Byte	Data	Description
0	0Dh	Id. PEQ Save Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## PEQ Delete Preset

Byte	Data	Description
0	0Eh	Id. PEQ Delete Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## PEQ Preset Name

Byte	Data	Description
0	0Fh	Id. Preset Name for PEQ-Preset
1	cc	Character 1
	...	...
16	cc	Character 16

## PEQ Dirty (Receive)

Byte	Data	Description
0	10h	Id. PEQ Dirty
1	f1	Function Group Id. 0x01
2	mi	Menu Id.

**MEQ-2000 Parameter Identifier for CUT (Notch and LC/HC Filters)**

CUT Filter

Byte	Data	Description
0	01h	Id. CUT Band
1	cc	Channel            0 = Ch1, 1 = Ch2
2	bb	Filter 0-7        0 = LC, 1 = HC, 2-7 = Notch
3	tt	0x7F
4	ff (MSB)	Frequency        20 Hz – 20 kHz for Notches (20 Hz = 0x000190) 3 Hz – 3 kHz for LC 300 Hz –30 kHz for HC (3 Bytes in 0.05 Hz steps)
5	ff	
6	ff (LSB)	
7	ww (MSB)	Bandwidth (Q)    8.65 to 69.3 in 0.01 steps
8	ww (LSB)	If MSB = 0x7F then BW (bandwidth) in octaves in LSB 0 = 1/6 Oct, 1 = 1/12 Oct , 2 = 1/24 Oct, 3 = 1/48 Oct for Filter 2 to 7 or Slope 0 = off, 1 = 6dB/Oct, 2 = 12dB/Oct, 3 = 18dB/Oct for Filter 0 and 1
9	gg (MSB)	Gain                -24dB to +8 dB (only for Filters 2 – 7) in +/- 0.01 dB steps (0 = 0x2000) ignore Gain for HC and LC
10	gg (LSB)	
11	tt	Type 0 = Butter, 1 = Bessel (for Filter 1 and 2)

CUT ON/OFF

Byte	Data	Description
0	02h	Id. CUT ON/OFF
1	oo	0 = off, 1 = on

CUT Channel Link

Byte	Data	Description
0	03h	Id. CUT Channel Link
1	oo	0 = off, 1 = on

CUT Load Preset

Byte	Data	Description
0	0Ch	Id. CUT Load Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id.        0 = User, 1 = Temp, 2= Factory

## CUT Save Preset

Byte	Data	Description
0	0Dh	Id. CUT Save Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## CUT Delete Preset

Byte	Data	Description
0	0Eh	Id. CUT Delete Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## CUT Preset Name

Byte	Data	Description
0	0Fh	Id. Preset Name for CUT-Preset
1	cc	Character 1
	...	...
16	cc	Character 16

## CUT Dirty (Receive)

Byte	Data	Description
0	10h	Id. CUT Dirty
1	f1	Function Group Id. 0x02
2	mi	Menu Id.

**MEQ-2000 Parameter Identifier for COM/LIM (Compressor/Limiter)**

## COM/LIM Channel

Byte	Data	Description
0	01h	Id. Com/Lim Channel
1	cc	Channel 0 = Ch1, 1 = Ch2
2	tt	Threshold 0dB to -60dB in 0.01dB steps (0 = 0x2000)
3	tt	
4	rr (MSB)	Ratio 1.0:1 to 99.9:1, INF=0x7F in 0.1 steps
5	rr (LSB)	
6	rr (MSB)	Co/Li 1:99 to 99:1 in 1 steps
7	rr (LSB)	
8	gg (MSB)	Gain 0dB to +48dB, in +/- 0.01 dB steps (0 = 0x0000)
9	gg (LSB)	
10	aa (MSB)	Attack 0.1ms to 100ms in 0.01ms steps (0.1ms = 0x000A)
11	aa (LSB)	
12	rr (MSB)	Release 10ms to 5000ms in 0.01ms steps (10ms = 0x0003E8)
13	rr	
14	rr (LSB)	
15	hh (MSB)	Hold 0dB to 3dB in 0.01dB steps (0 = 0x0000)
16	hh (LSB)	
17	aa	ART 0 = off, 1 = lazy, 2 = norm, 3 = quick

## COM/LIM Look-Ahead Delay

Byte	Data	Description
0	02h	Id. Com/Lim LA-Delay
1	dd (MSB)	LA Delay Time 0.2ms to 100ms in 0.01 steps (0.2ms = 0x000014) If MSB = 0x7F then time in LSB 0 = 0.2ms, 1 = 0.3ms, 2 = 0.5ms, 3 = 1ms, 4 = 2ms, 5 = 3ms, 6 = 5ms, 7 = 10ms, 8 = 20ms, 9 = 30ms, 10 = 50ms, 11 = 100ms
2	dd	
3	dd (LSB)	

## COM/LIM ON/OFF

Byte	Data	Description
0	03h	Id. Com/Lim ON/OFF
1	oo	0 = off, 1 = on

## COM/LIM Channel Link

Byte	Data	Description
0	04h	Id. Com/Lim Channel Link
1	ll	0 = off, 1 = on

## COM/LIM Stereo Coupling

Byte	Data	Description
0	05h	Id. Com/Lim Coupling
1	cc	0 = off, 1 = on

## COM/LIM Attack Time Compensation

Byte	Data	Description
0	06h	Id. Com/Lim Att Comp
1	aa	0 = off, 1 = on

## COM/LIM Ceiling

Byte	Data	Description
0	07h	Id. Com/Lim Ceiling
1	ce	0 = off, 1 = on

## COM/LIM Load Preset

Byte	Data	Description
0	0Ch	Id. Com/Lim Load Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp, 2 = Factory

## COM/LIM Save Preset

Byte	Data	Description
0	0Dh	Id. Com/Lim Save Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## COM/LIM Delete Preset

Byte	Data	Description
0	0Eh	Id. Com/Lim Delete Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## COM/LIM Preset Name

Byte	Data	Description
0	0Fh	Id. Preset Name for Com/Lim-Preset
1	cc	Character 1
	...	...
16	cc	Character 16

## COM/LIM Dirty (Receive)

Byte	Data	Description
0	10h	Id. Com/Lim Dirty
1	fi	Function Group Id. 0x03
2	mi	Menu Id.

Parameter Identifier for Meter Change, see page 77.

**MEQ-2000 Parameter Identifier for DELAY**

DELAY Length

Byte	Data	Description
0	01h	Id. Delay Length
1	cc	Channel 0 = Ch1, 1 = Ch2
2	ll (MSB)	Delay Length 0 to 119040 in Samples (0 = 0x000000)
3	ll	
4	ll (LSB)	

DELAY ON/OFF

Byte	Data	Description
0	02h	Id. Delay ON/OFF
1	oo	0 = off, 1 = on

DELAY Channel Link

Byte	Data	Description
0	03h	Id. Delay Channel Link
1	ll	0 = off, 1 = on

DELAY Temperature (relevant only for proper LCD update)

Byte	Data	Description
0	04h	Id. Delay Temperature
1	tt	Temperature 0°C to 50°C in 0.5 degree steps (0 = 0x00)

DELAY Load Preset

Byte	Data	Description
0	0Ch	Id. Delay Load Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp, 2 = Factory

DELAY Save Preset

Byte	Data	Description
0	0Dh	Id. Delay Save Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## DELAY Delete Preset

Byte	Data	Description
0	0Eh	Id. Delay Delete Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## DELAY Preset Name

Byte	Data	Description
0	0Fh	Id. Preset Name for Delay-Preset
1	cc	Character 1
	...	...
16	cc	Character 16

## DELAY Dirty (Receive)

Byte	Data	Description
0	10h	Id. Delay Dirty
1	fi	Function Group Id. 0x04
2	mi	Menu Id.

**MEQ-2000 Parameter Identifier for RTA ( Real Time Analyzer)**

RTA Channel Select

Byte	Data	Description
0	01h	Id. RTA Channel
1	cc	Channel 0=off, 1=Ch1, 2=Ch2, 3=Ch1+Ch2

RTA Range

Byte	Data	Description
0	02h	Id. RTA Range
1	rr (MSB)	Range 6dB to 144dB in 0.01 dB steps (0 = 0x0000)
2	rr (LSB)	

RTA Offset

Byte	Data	Description
0	03h	Id. RTA Offset
1	oo (MSB)	Offset 0.0dB to 144dB in 0.01 dB steps (0 = 0x0000)
2	oo (LSB)	

RTA Decay Time

Byte	Data	Description
0	04h	Id. RTA Decay Time
1	dd (MSB)	Decay time 500ms to 5000ms in 0.01ms steps (500ms = 0x00C350)
2	dd	
3	dd (LSB)	

RTA RMS-IT

Byte	Data	Description
0	05h	Id. RTA RMS-IT
1	rr	RMS-IT 0 = 10ms, 1 = 20ms, 2 = 50ms, 3 = 100ms, 4 = 200ms, 5 = 500ms, 6 = 1s, 7 = 2s, 8 = 5s, 9 = 10s, 0x0A = 20s, 0x0B = 1min, 0x0C = 2min, 0x0D = 5min, 0x0E = 10min, 0x0F = 20min

RTA Decay Time

Byte	Data	Description
0	06h	Id. RTA Source
1	ss	0 = Input, 1 = Output

Parameter Identifier for RTA Change, see page 77.

**MEQ-2000 Parameter Identifier for LIMITER**

## LIMITER Channel

Byte	Data	Description
0	01h	Id. Limiter Channel
1	cc	Channel 0 = Ch1, 1 = Ch2
2	tt (MSB)	Threshold 0dB to - 48dB in 0.01dB steps (0 = 0x2000)
3	tt (LSB)	
4	hh(MSB)	Hold 0ms to 200ms in 0.01ms steps (0 = 0x0000) AUTO = 0x3FFF
5	hh	
6	hh (LSB)	
7	rr (MSB)	Release 20ms to 5000 ms in 0.01ms steps (20ms = 0x 0007D0)
8	rr	
9	rr (LSB)	
10	gg (MSB)	Gain 0dB to +48dB, in +/- 0.01 dB steps (0 = 0x0000)
11	gg (LSB)	

## LIMITER Look-Ahead Delay

Byte	Data	Description
0	02h	Id. Limiter LA Delay
1	dd (MSB)	LA Delay Time 0.01ms to 10ms in 0.01ms steps (0.01ms = 0x000001)
2	dd	
3	dd (LSB)	If MSB = 0x7F then time in LSB 0 = 0.2ms, 1 = 0.3ms, 2 = 0.5ms, 3 = 1ms, 4 = 2ms, 5 = 3ms, 6 = 5ms, 7 = 10ms

## LIMITER ON/OFF

Byte	Data	Description
0	03h	Id. Limiter ON/OFF
1	oo	0 = off, 1 = on

## LIMITER Channel Link

Byte	Data	Description
0	04h	Id. Channel Link
1	ll	0 = off, 1 = on

## LIMITER Stereo Coupling

Byte	Data	Description
0	05h	Id. Limiter Coupling
1	cc	0 = off, 1 = on

## LIMITER Ceiling

Byte	Data	Description
0	06h	Id. Limiter Ceiling
1	ce	0 = off, 1 = on

LIMITER Load Preset

Byte	Data	Description
0	0Ch	Id. Limiter Load Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp, 2 = Factory

LIMITER Save Preset

Byte	Data	Description
0	0Dh	Id. Limiter Save Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

LIMITER Delete Preset

Byte	Data	Description
0	0Eh	Id. Limiter Delete Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

LIMITER Preset Name

Byte	Data	Description
0	0Fh	Id. Preset Name for Limiter-Preset
1	cc	Character 1
	...	...
16	cc	Character 16

LIMITER Dirty (Receive)

Byte	Data	Description
0	10h	Id. Limiter Dirty
1	fi	Function Group Id. 0x07
2	mi	Menu Id.

Parameter Identifier for Meter Change, see page 77.

**MEQ-2000 Parameter Identifier for LEVELS**

## LEVELS Channel

Byte	Data	Description
0	01h	Id. Levels Channel
1	cc	Channel 0 = Ch1, 1 = Ch2
2	pp	Path 0 = Analog In, 1 = Analog Out, 2 = Digital In, 3 = Digital Out
3	pp	Phase 0 = Normal, 1 = Inverted
4	ss	Channel Swap 0 = off, 1 = on
5	gg (MSB)	Gain -36dB to +12dB in +/- 0.01 dB steps (0 = 0x2000)
6	gg (LSB)	

## LEVELS ON/OFF

Byte	Data	Description
0	02h	Id. Levels ON/OFF
1	oo	0 = off, 1 = on

## LEVELS Channel Link

Byte	Data	Description
0	03h	Id. Levels Channel Link
1	ll	0 = off, 1 = on

## LEVELS Clip

Byte	Data	Description
0	04h	Id. Levels Clip
1	cc	0 = hard, 1 = soft1, 2 = soft2

## LEVELS Dirty (Receive)

Byte	Data	Description
0	10h	Id. Levels Dirty
1	fi	Function Group Id. 0x08
2	mi	Menu Id.

### MEQ-2000 Parameter Identifier for GEN (Generator)

#### GEN Channel Select

Byte	Data	Description
0	01h	Id. GEN Channel
1	cc	Channel 0=CH1, 1 = CH2

#### GEN ON/OFF

Byte	Data	Description
0	02h	Id. GEN ON/OFF
1	oo	0 = off, 1 = on

#### GEN Channel Link

Byte	Data	Description
0	03h	Id. GEN Channel Link
1	ll	0 = off, 1 = on

#### GEN Type

Byte	Data	Description
0	04h	Id. GEN Type
1	tt	0 = SIN, 1 = FREQUENCY SWEEP, 2 = PINK, 3 = WHITE 4 = CONST, 5 = TRIANGLE
2	aa (MSB)	Amplitude 0dB to -144dB in 0.01dB steps (0 = 0x4000), only for type 0-3
3	aa (LSB)	
4	ff (MSB)	Frequency in Type 0 9.84 Hz - 42714 Hz
5	ff	Frequency in Type 1 20.0 Hz - 20000 Hz (Standard Sweep)
6	ff (LSB)	Frequency in Type 1 9.84 Hz - 42714 Hz (Extended Sweep) in 0.05 Hz steps
7	pp (MSB)	Phase (only in type 0), 0 degree to 360 degrees in 1 degree steps (0 = 0x00)
8	pp(LSB)	
9	vv	Value (only in type 4), 0 = 0x000000, 1 = 0xFFFFF, 2 = 0x555555, 3 = 0xAAAAAA, 4 = 0x7FFFFFF, 5 = 0x800000, 6 = 0xF0F0F0, 7 = 0x0F0F0F, 8 = 0xCCCCC, 9 = 0x333333
10	rr	Range (only in type 5), 0 = 16 Bit, 1 = 20 Bit, 2 = 24 Bit
11	ll	Length in samples (only in type 5), 0 = 1, 1 = 2, 2 = 4, 3 = 8, 4 = 16, 5 = 32
12	ss	Step (only in type 5), 0-16

#### GEN Sweep

Byte	Data	Description
0	05h	Id. GEN Sweep
1	tt	Sweep Type 0 = continuous, 1 = one-time (only in type 1)
2	dd	Sweep Direction 0 = up, 1 = down, 2 = up/down (only in type 1)
3	rr	Frequency Range (only in type 1) 0 = STAND, 1 = EXTEND
4	ss	Step (only in type 1) 0 = 1/3Oct, 1 = 1/6Oct, 2 = 1/12Oct
5	ii	Sweep Interval 0 = 100ms, 1 = 300ms, 2 = 500ms, 3 = 1s, 4 = 3s, 5 = 5s, 6 = 10s, 7 = 30s 0x7F = INF (only in type 1)

**MEQ-2000 Parameter Identifier for CONFIG (System Configuration)**

## CONFIG

Byte	Data	Description
0	01h	Id. Configuration
1	cc	Configuration 0 = Mastering1, 1 = Mastering2, 2 = Reinforcement1, 3 = Reinforcement2, 4 = Measurement1, 5 = Measurement2
2	ii	Input 0 = Analog, 1 = Digital-XLR, 2 = Digital-COAX, 3 = Digital-OPTO
3	mm	Mode 0 = 2-Channel, 1 = MONO1, 2 = MONO2, 3 = MONO1+2
4	oo	Output 0 = Analog, 1 = Digital, 2 = Analog+Digital
5	nn	Insert 0 = off, 1 = INP, 2 = DEL, 3 = CUT, 4 = COM/LIM or LIM, 5 = PEQ, 6 = GEO
6	mm	DO Mode 0 = PROF(AES-3), 1 = CONSUMER (SPDIF)
7	ff	DO-FS 0 = 32kHz, 1 = 44.1kHz, 2 = 48kHz, 3 = 64kHz, 4 = 88.2kHz, 5 = 96kHz
8	ww	DO-WL 0 = 16Bits, 1 = 20Bits, 2 = 24Bits
9	dd	DI-Select 0 = D-XLR, 1 = D-COAX, 2 = D-OPTO
10	mm	Dither 0 = off, 1 = on

## CONFIG Load Preset

Byte	Data	Description
0	0Ch	Id. Config Load Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp, 2 = Factory

## CONFIG Save Preset

Byte	Data	Description
0	0Dh	Id. Config Save Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## CONFIG Delete Preset

Byte	Data	Description
0	0Eh	Id. Config Delete Preset
1	fi (MSB)	File Id.
2	fi (LSB)	
3	di	Drive Id. 0 = User, 1 = Temp

## CONFIG Preset Name

Byte	Data	Description
0	0Fh	Id. Preset Name for Config-Preset
1	cc	Character 1
	...	...
16	cc	Character 16

**MEQ-2000 Parameter Identifier for INFO**

Request Device Status (Receive)

Byte	Data	Description
0	01h	Id. Request Device Status
1	F7	End of System Exclusive Message

Device Status (Send)

Byte	Data	Description
0	40h	Id. Device Status
1	ii	Input
2	ff	FSI
3	ww	WLI
4	ss	SRCI
5	oo	Output
6	ff	FSO
7	ww	WLO
8	ss	SRCO
9	cc	CONFIG
10	ll	LOCK
11	rr	Remote
12	MSB	FSI Measured MSB/LSB
13	LSB	FSI Measured MSB/LSB
14	F7	End of System Exclusive Message

**MEQ-2000 Parameter Identifier for System**

Remote Access

Byte	Data	Description
0	01h	Id. Remote Access
1	As	Access State, 0x00 = OFF, 0x01 = Remote Access, 0x02 = Remote Access with Key Lock

Request Busy

Byte	Data	Description
0	03h	Id. Request Busy

System Dirty

Byte	Data	Description
0	10h	Id. Dirty
1	mi (MSB)	Menu Id.
2	mi (LSB)	

Hard Reset (Receive)

Byte	Data	Description
0	00h	Id. Hard Reset
1..16	ds	Device Serial Number

**MEQ-2000 Parameter Identifier for FTP**

## Find File (Receive)

Byte	Data	Description
0	01h	Id. Find File (send Status)
1	id	Request Id (important to get the correct status)
2	cc	Character 1 (Path)
..	cc	.....
n	cc	Character n (Path)
n+1	00	End of string

## Next File (Receive)

Byte	Data	Description
0	02h	Id. Next File (send Status)
1	id	Request Id (important to get the correct status)

## Get File Info (Receive)

Byte	Data	Description
0	03h	Id. Get File Info (send File Info)
1	id	Request Id (important to get the correct File Info)

## Close (Receive)

Byte	Data	Description
0	04h	Id. Close
1	id	Request Id (important to close the correct File Find)

## File Open (Receive)

Byte	Data	Description
0	05h	Id. File Open (send Handle)
1	id	Request Id (important to get the correct handle and Data packets)
2	rw	Open mode 0 = Read, 1 = Write
3	cc	Character 1 (Path)
..	cc	.....
n	cc	Character n (Path)
n+1	0	End of string

## File Close (Receive)

Byte	Data	Description
0	06h	Id. File Close
1	id	Request Id.
2	hh	Handle

File Write (Receive)

Byte	Data	Description
0	07h	Id. File Write
1	id	Request Id
2	hh	Handle
3	nn	Number of bytes
4	dd	Data
..	dd	.....
n	dd	Data n
n+1	cc	Checksum MSB
n+2	cc	Checksum LSB

File Read (Receive)

Byte	Data	Description
0	0Fh	Id. File Read
1	cc	Request Id
2		Handle
3	cc	Number of bytes

Status (Send)

Byte	Data	Description
0	40h	Id. Status
1	id	Request Id
2	ss	0 = False, 1 = True

File Info (send)

Byte	Data	Description
0	41h	Id. Filename
1	id	Request Id
2	at	Attribute
3	cc	Character 1
..	cc	.....
n	cc	Character n
n+1	0	End of string

Handle (Send)

Byte	Data	Description
0	42h	Id. Handle
1	id	Request Id
2	hh	0 = Error, 1 7f = valid handle

File Data (send)

Byte	Data	Description
0	43h	Id. File Data
1	id	Request Id
2	nn	Number of bytes
3	dd	Data
..	dd	.....
n	dd	Data n
n+1	cc	Checksum MSB
n+2	cc	Checksum LSB

**MEQ-2000 Parameter Identifier for DEBUG**

Debug-Character

Byte	Data	Description
0	01h	Id. Character for Monitor
1	cc (MSB)	Character MSB
2	cc (LSB)	Character LSB

**MEQ-2000 Parameter Identifier for RTA and Meter Change**

*The value of a frequency beam is sent only if it has changed. For the transfer of beam values the Polyphonic Aftertouch message is used in the following way:*

RTA Change

Byte	Data	Description
0	0xA0	Polyphonic Aftertouch used for RTA (Running Status supported)
1	bb	0 - 30 = RTA Band 0 to 30
2		100 - 105 = Meter (In, Out, Gainreduction for Limiter and Com/Lim)
3	ll	RTA Level 0x00 to 0x7F

**MEQ-2000 Parameter Identifier for MUTE and BYPASS**

*For Mute and Bypass Function the Control Change message is used in the following way:*

MUTE/BYPASS

Byte	Data	Description
0	0xB0	Control Change message used for Mute and Bypass
1	nn	Controller number, Bypass = 0x0F, Mute = 0x68
2	vv	Controller value, 0x00 = OFF, 0x7F = ON

## Appendix II : Jumpers

The **MEQ-2000** is configured for interconnection with a proper developed equipment using balanced analog inputs and outputs and grounding of pin 7 as defined in the reference literature. (*see special issue of AES JOURNAL, Volume 43, Number 6, 1995 June*)

Many companies, however, do not follow these rules and cause problems with ground loops and RF noise. Actually we do not like to support all this mess, but if you discover any invincible problems with hum in non-conforming devices, or asymmetrical sources and loads you may check different jumpers settings for analog inputs and outputs.

CH1	input	J1	Pin 1	open
		J2	Pin 1	signal ground
		J3	Pin 1	housing ground *)
		J4	Pin 1	housing ground & signal ground over capacitors (default)
CH2	input	J5	Pin 1	open
		J6	Pin 1	signal ground
		J7	Pin 1	housing ground *)
		J8	Pin 1	housing ground & signal ground over capacitors (default)
CH1	output	J17	Pin 1	signal ground
		J18	Pin 1	housing ground (default)
CH2	output	J26	Pin 1	signal ground
		J27	Pin 1	housing ground (default)

\*) It is highly recommended that the Pin 1 in all inputs and outputs in the device chain is chassis grounded.

Normally the **MEQ-2000** is delivered with Hard Bypass function. There is a possibility to switch the jumpers to the Hard Mute mode. In this case the cables BYP-L1/L2 and BYP-R1/R2 have to be removed and the jumpers J13, J14, J15, J16, J22, J23, J24, J25 put in. Finally a software reconfiguration has to be done in in AUX window in UTILITY menu.

If for any reason you permanently need -12 dB lower output level than specified, you can change the jumpers J11 and J12 on the analog board from position 1-2 to 2-3.

Also on the MIDI, RS-232, and Digital Input/Output boards, a *signal ground* or *ground lift* are possible if necessary in extreme cases.

**All the changes described in Section 6 can be done ONLY by authorized personal.**

