Operating Manual

LEVEL MAGIC ™

transmission processor

Level Magic LT

digital audio processing

release 1.1

junger audio

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FOREWORD

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Thank you for buying and using the 2-channel Digital Audio Level Processor Level Magic LT.

You have acquired the latest generation of digital dynamic range processing, a piece of equipment which is unique in its design and specification.

Please read this manual carefully to ensure you have all the information you need to use the Digital Audio Level Processor Level Magic LT.

The unit was manufactured under highest industrial standards and went through extensive quality control checks before it was supplied.

If you have any comments or questions about installing, setting-up or using the Level Magic LT, please do not hesitate to contact us.

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CONTENTS

FUNCTIONAL DESCRIPTION

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2.1 BASIC DESCRIPTION

The Level Magic™ LT Digital Dynamics Processor provides automated level control, both Transient Control and AGC
-that truly works!

The Level Magic™ Dynamics Processing developed by Jünger Audio enable level managing devices like compressors, AGC and limiters to give you precise natural control without coloration, pumping, breathing, distortions or modulation effects. The outstanding quality of the processing is based on the Multi-Loop dynamic range control principle in combination with adaptive controlled processing algorithms developed by Jünger Audio.

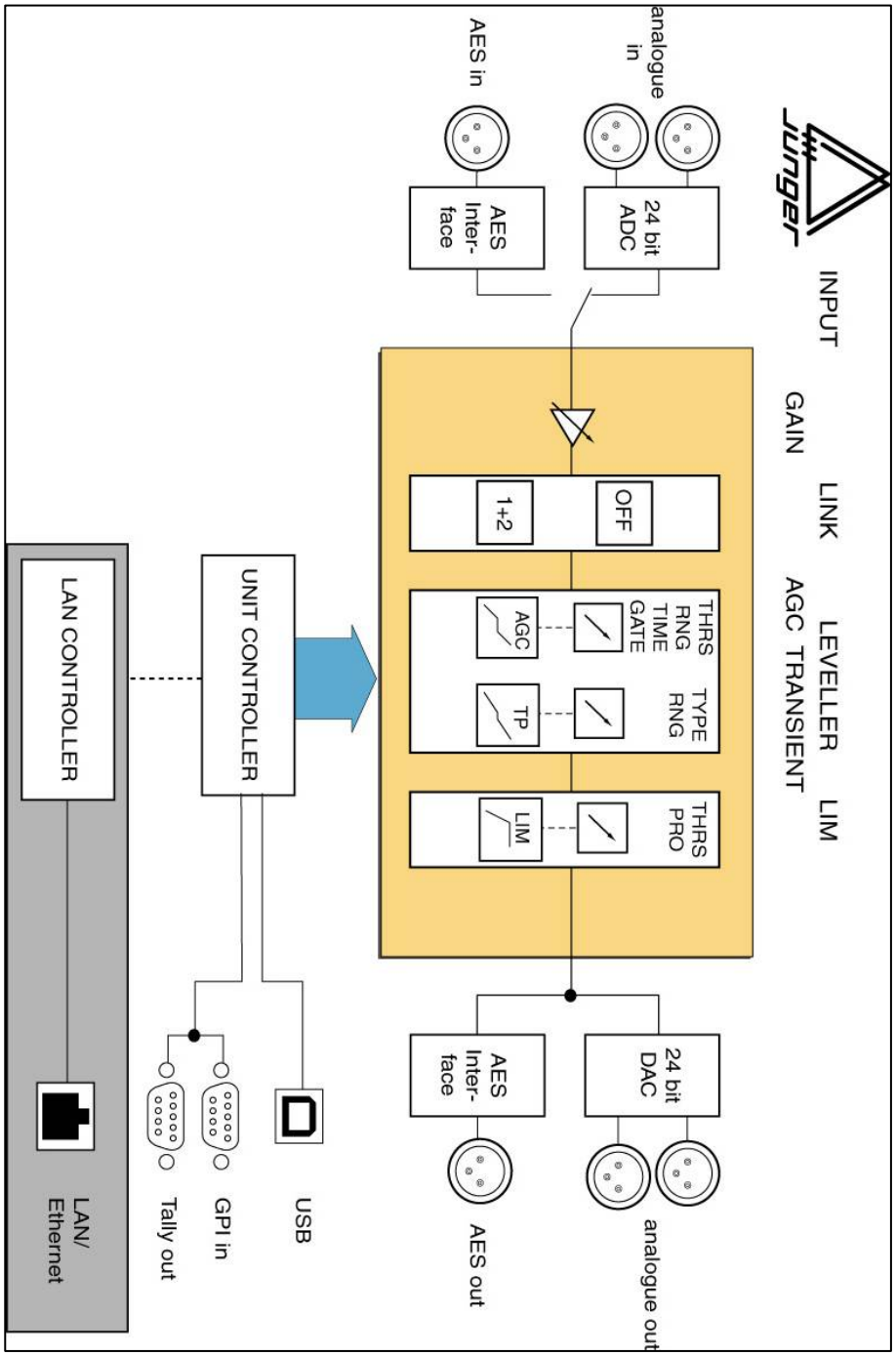
The Level Magic™ LT is easy to operate and requires only a limited number of settings to be made by the user to achieve optimum results. All other parameters necessary for inaudible processing are continuously automatically controlled in response to changes in the program signal.

In short: The Level Magic™ LT gives you almost inaudible processing – coupled with extraordinary ease of use.

Level Magic™ LT features

- Analog and AES Digital inputs and outputs
- 2-channels of Adaptive Audio Leveling Processing
  AGC, Transient Processor and Limiter
- Adjustable input gain (-20...+20 dB)
- Operation via Web Interface (TCP/IP)
- Password protection for View-, Operator- and Admin-logins
- User friendly Presets
- GPI interface for Parallel Remote Control and Tally output

2.2
BLOCK DIAGRAM



INSTALLATION

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3.1 UNPACK THE UNIT

The Level Magic™ LT Digital Audio Level Processor was carefully packed at the factory with packaging designed to protect the unit from rough handling during shipment. Please examine the packaging and its contents carefully for any signs of physical damage, which may have occurred in shipment.

3.2 POWER SUPPLY

The Level Magic™ LT Digital Audio Level Processor is classified under the safety category *Schutzklasse 1* in keeping with the VDE 0804 standards and may only be used with power supply installations built according to these regulations.
Check to insure that the mains supply voltage details printed on the rear panel are the same as your local mains electricity supply.

3.3 CONNECTIONS

The Level Magic™ LT Digital Audio Level Processor is equipped with standard connectors (see Chapter 3).
Before making connections to the Level Magic™ LT switch off the power to all units that you are connecting to the Level Magic™ LT.

3.4 RACK MOUNTING

The Level Magic™ LT Digital Audio Level Processor is a standard 19“unit (EIA format). That is 1 RU (44 mm) high. Please allow at least 3“depth in addition for the connectors on the rear panel.
When installing the unit in a 19“ rack the rear side of the unit may need support, especially when mounting in flight cases.

3.5 OPERATION SAFETY

The Level Magic™ LT Digital Audio Level Processor should not be installed near units which produce strong magnetic fields or extreme heat. Do not install the audio processor directly above or below power amplifiers.
If, during operation, the sound is interrupted or displays no longer illuminate, or if abnormal odor or smoke is detected, immediately disconnect the power cord plug immediately and contact your dealer or Jünger Audio.

3.6 AUDIO CONNECTIONS

The analogue audio inputs are RFI filtered. The analog outputs are balanced and floating. All the audio connectors are mounted at the rear panel. Standard XLR connectors are used wired to the AES standard:

pin 1	X	Screen	
pin 2	L	+ Audio	(Live audio 0°)
pin 3	R	- Audio	(Return audio 180°)

Balanced connections are preferred whenever the other equipment provides balanced inputs/outputs. All line level connections should be wired with twin screened cable for low noise and reliability. The screen for the input of the cable should be connected only at the signal source end. The screen for the output cable should be connected only at he Level Magic™ LT connector.

An unbalanced source should still be connected to the Level Magic™ LT using twin screened cable. At the signal source end add a wire jumper so that the screen is connected to the wire that will go to PIN3 of the XLR on the other end, where it connects to the XLÖR on the Level Magic™ LT.

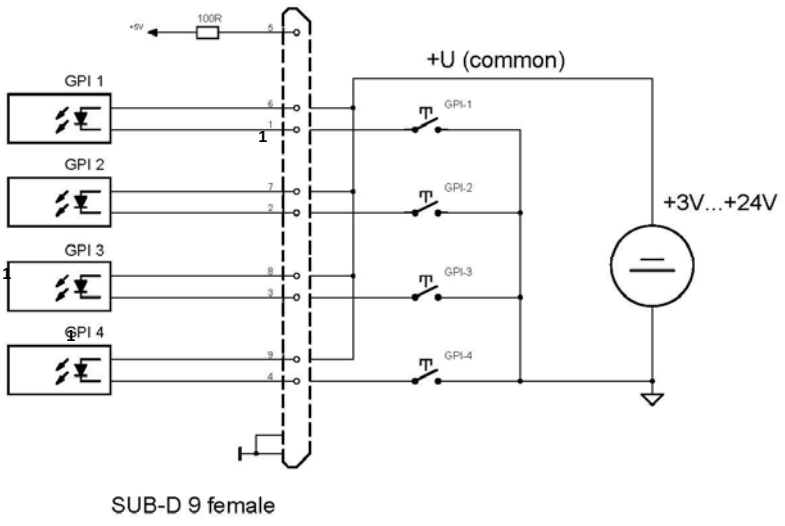
If the equipment following the Level Magic™ LT only has unbalanced inputs, then we recommend still to use a twin screened cable where Pin1 and Pin3 are connected in the cable end at the following equipment (that I s, not at the Level Magic™ LT end).

3.7.1 GPI REMOTE CONTROL (PARALLEL REMOTE)

The Level Magic™ LT Digital Audio Level Processor can be remote-controlled by means of parallel GPI contacts.

Use : Remote Controlled changeover of presets and special settings

Connector: D-SUB 9pin, female



Pin assignments

Pin	Signal name	Functions
1	GPI1 in	Defined via software -> setup
2	GPI	
3	GPI2 in	Defined via software -> setup
4	GPI	
5	GPI5 in	Auxiliary supply
6	GPI3	Defined via software -> setup
7	GPI	
8	GPI4	Defined via software -> setup
9	GPI	

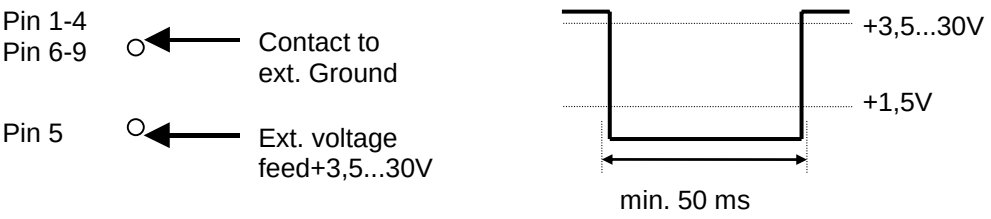
Electrical specifications:

GPI input Potential free by opto-coupler, low active
Off: +3.5…+30V between GPI input and the common pin 5.
On : less then 1.5V

Signal input level LOW: 1,5V or less for a minimum of min. 50ms

level HIGH: 3,5V or more

Characteristic Static GPI,

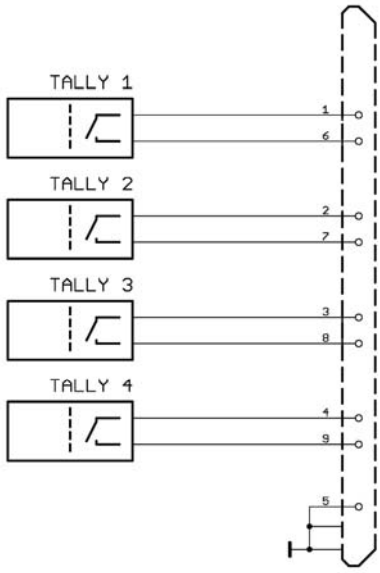


3.7.2 TALLY OUT

The Level Magic™ LT Digital Audio Level Processor can transmit specific device statuses via parallel Tally lines.

Use: Indication of the Unit's basic status

Connector : D-SUB 25pin
female panel jack



Pin assignment of the connector :

Pin	Signal name	Functions
1	Tally 1	Defined via software
2	Tally 2	Defined via software
3	Tally 3	Defined via software
4	Tally 4	Defined via software
5	Ground	
6	Tally 1 Common	
7	Tally 2 Common	
8	Tally 3 Common	
9	Tally 4 Common	

Electrical specifications:

Tally output relay : common /
normally opened

24V - 1A
125V - 0,5A
P_{max} = 62,5VA

3.8 LAN INTERFACE

The Level Magic™ LT Digital Audio Level Processor is set up and operated via web interface (Internet Explorer/mozilla firefoxx). The connection is over Ethernet.

Connector : RJ 45 with status LEDs
8 pin panel jack

Pin assignment of the connector :

Pin	Signal name	Functions
1	TX +	Ethernet send
2	TX -	Ethernet send
3	RX +	Ethernet receive
4		
5		
6	RX -	Ethernet receive
7		
8		
9		

Electrical specifications: 100Mbit/s auto negotiation port

This port allows remote control of the Level Magic LT by **TCP/IP over Ethernet.**

The controller of the Level Magic™ LT acts as a CAN-controller (CAN-server) for an external client. For details please refer to the **Level Magic LT web interface** description (5.2 OPERATION).

For integration of the Level Magic LT into a LAN your unit hass been given it's own IP address (shown on a label on the rear of the unit) and needs to be given a sub net mask of the used LAN.
For network integration of your device refer to 5.1.1 Operation – Jünger terminal – network integration).

3.9 USB CONNECTOR

This port allows network configuration and password administration.

Before you connect the Level Magic LT via USB to your PC please install the junger terminal (CD-Rom, see 5.1 OPERATION – junger terminal).

Connector : USB 1.0

USB connector for **serial** data transfer

FRONT AND BACK PANEL

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4.1. FRONT PANEL

Fig. 1: Front panel of the Level Magic™ LT

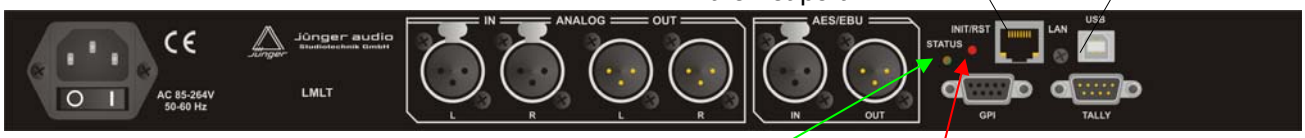
Bypass-button

ON/OFF status LED

If you hold the bypass-button pressed while switching on the unit, the controller of the DSP will be **initialized**.
All user presets are overwritten, Parameters will be set to the TV uni factory default.
BACKUP presets to your PC first!

4.2. REAR PANEL

fig. 2: rear panel Level Magic™ LT



LAN Ethernet port

USB port

Power supply

Analog I/O

AES Digital I/O

GPI port

TALLY port

The green LED left of the Ethernet connector is a status indicator that shows if the controller is ready to work

When you press the **red button** for a short time a reset of the Unit is performed, as if you had cycled power off and on.
If you press the **red button** for a **longer** time, the LED will begin to flash and the built-in Web Controller will be reset. Then the factory **default network configuration** of the device will be restored. If you have changed the IP address of the unit from that shown on the sticker, you will not have access via your PC GUI. You will have to change it again via Jünger terminal (See 5.1.1).

POWER INPUT
IEC mains input connector with integrated fuse for 85-264 V50/60 Hz

GPI

GPI-in +3,5…+30V potential-free
connector: 9pin SUB-D, female

TALLY-out open relais contact
connector: 9pin SUB-D, female

ETHERNET
Interface for LAN Controller (Web Interface)

USB
USB connector for setting the Network Configuration

ANALOG IN/OUT
Analog input is via 24 bit A/D-converters
Input floating and balanced with two female XLR connectors
Analog output is from 24 bit D/A-converters
Output floating and balanced with two male XLR connectors

DIGITAL IN
Digital input is to the AES/EBU standard format
connector: female XLR

DIGITAL OUT
Digital output is to the AES/EBU standard format
connector: male XLR

OPERATION

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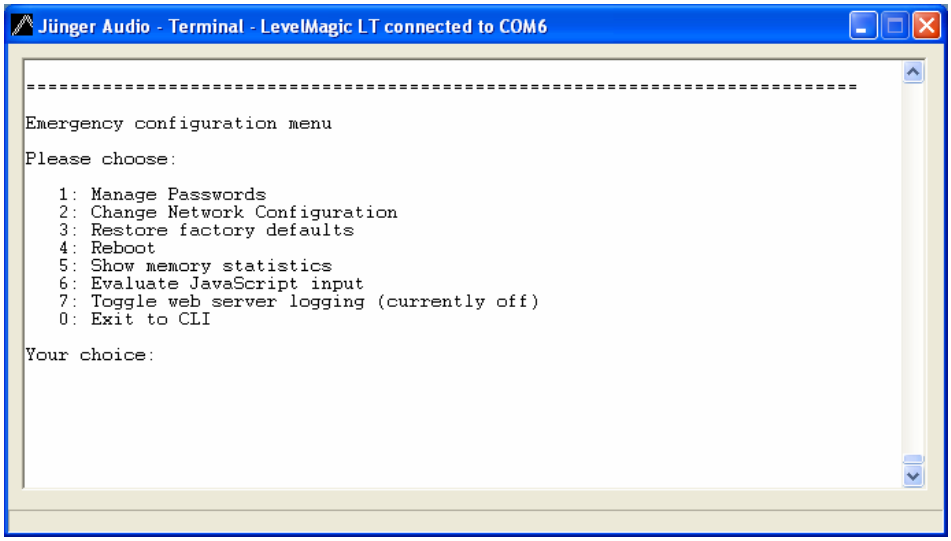
5.1 junger Terminal

installation

Included in delivery you got a CD-Rom (junger audio Configurator). The CD-Rom includes a program, the“junger terminal”, to setup your device via USB. Main features are setup of the network configuration and of the password management.

It has to be installed at your PC before you connect the Level Magic LT via USB or Ethernet connector.

Insert the CD-ROM into your PC’s CD-drive. The setup.exe is started. Follow the installation procedure (java1.6 included).
After installation of the “junger terminal” (icon on your desktop!) connect the Level Magic LT via USB to your PC. (Don’t forget to power on the device now!)
When you start the terminal program the “LM LT” will be offered in the range of your COM connections (it is only a physical USB-connector transmitting data). Choose the LM LT and you will get into the terminal program:



Here you can manage the passwords for operators and administrators (**1**), change the network configuration of the device (**2**), restore factory defaults (**3**) and reboot the controller (**4**).
All advanced features (**5,6,7,0**) might be useful when you have problems with your device. **Before you use one of these features** please call Jünger Audio and you will get support by our software department.

5.1.1 Network configuration

First you have to match the network configuration of the Level Magic LT to the configuration of your PC.
(**junger terminal -> 2 change network configuration**)

If you are not familiar with network configuration please ask your network administrator for help!

The default network configuration of the Jünger devices is:

IP Address: **on a label at the Ethernet connector socket at the rear of the device**
Netmask: **255.255.0.0.**
Gateway: **10.110 0.1.**

Change this configuration into a valid IP-address, netmask and gateway matching to your PC and - if you have a LAN - to your LAN.
After having changed the network configuration you have to reboot the web controller (**junger terminal 4 – reboot**)

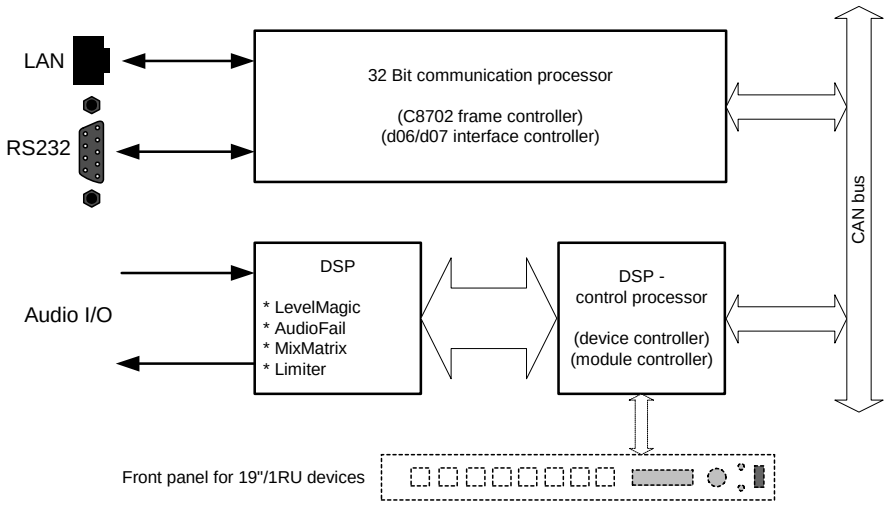
Please write the new IP-address of the device at the rear of the device. Otherwise using the factory default IP-address might cause confusion later!

If you have a LAN in your working environment you can connect the Level Magic LT now via ethernet cable.
If you connect the Level Magic LT directly to your PC, you need an Ethernet crossover cable (not connected 1 to 1, but 1 to 8 etc…).

5.1.2 Web interface/ Setup of the IE 7.x

Now you will be able to operate the Level Magic LT via web browser. Just type in the new IP-address into your browser (e.g. Internet Explorer - http://IP-address) und you will get access to the web interface of the device.

The web interface / GUI is based on common web technologies so you can display it nearly everywhere. External access to the Junger units is maintained by a dedicated 32Bit communication processor solution. For C8k systems it fits on a C8k module, the C8702 “Frame Controller”. 19”/1RU devices like the LMLT / d06 / d07 employing the same hardware by a built-in piggyback, let’s call it the “Interface Controller”. You can treat a 1RU device as a combination of C8k modules build in one chassis.
The communication processor does not control the DSP parameters directly. It transfers commands and data from and to a DSP control processor which on the other hand controls the DSP parameters but also front panel controls as well as GPI/Os. For data transfer between the DSP control processors and the communication processor we use the CAN bus internally. Therefore the external communication is somewhat shielded from the audio processing by this two stage approach so you can update the firmware image of the communication processor without disturbing the audio processing :

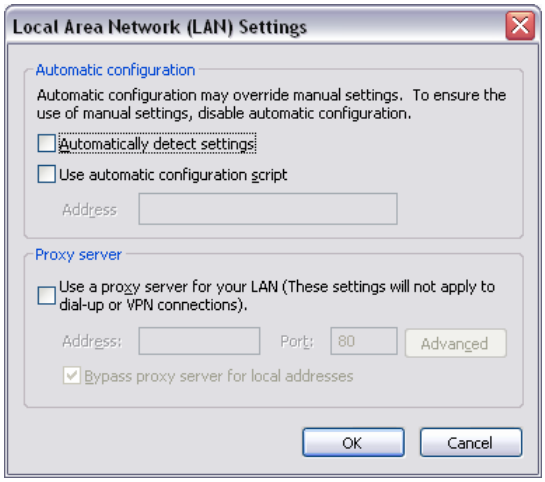


The **communication processor** runs a **HTTP** (web-) **server**, an **UDP server**, and a **SNMP agent**.
Over a serial 1:1 connection, (RS232: 115200, 8, N, 1, no protocol) you can gain access to the **consol interface** (see Network Configuration above). It offers low level communication for administrative and testing purposes. The functions available from the console interface may be very from different frame controller firmware versions.

We support the GUI functions for **IE 7.x** and **Firefox 2.0.** For proper operations, the environment needs some settings which are not set up by default when installing MS-Windows, so you must do change the settings:

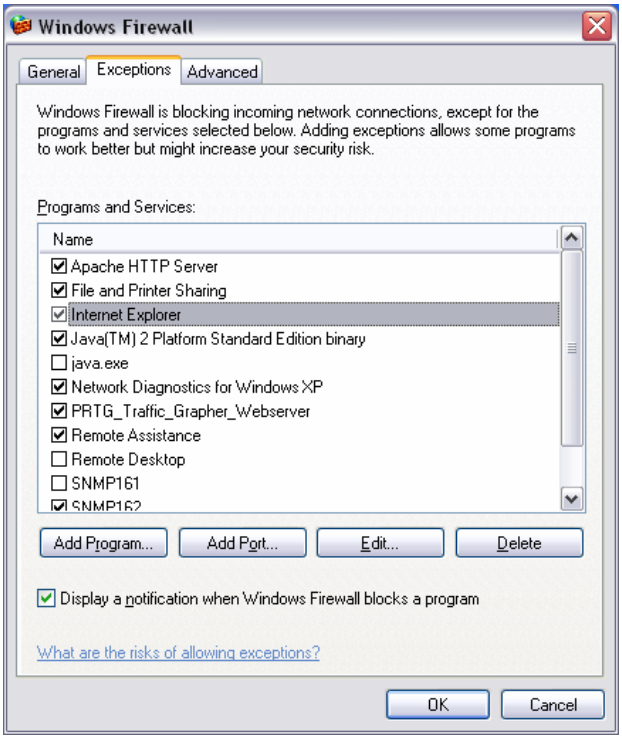
* You must **"allow cookies"** from the Junger Units. Pay attention to settings of **3rd party tool bars** (like Yahoo) which may overwrite the browser general settings!
* The security option **"Downloads"** >> **"Automatic prompting for file downloads"** must be set to: **"activate"** in order to receive files from the unit.
* Java Script must be allowed.
* **Java Virtual Machine > 1.6** must be installed on the PC in order to receive level meter display.
  You will get it as a free download from SUN Microsystems www.java.com
* If your PC is part of a MS Domain, you must check if the LAN settings are correct.

If you have manually configured your IE settings you must disable Automatic configuration as well as the use of a proxy server for your LAN:
Tools > Internet options > Connections > LAN settings: :



Otherwise it could happen that your settings are overwritten automatically. It is important to bypass the proxy server for local addresses.

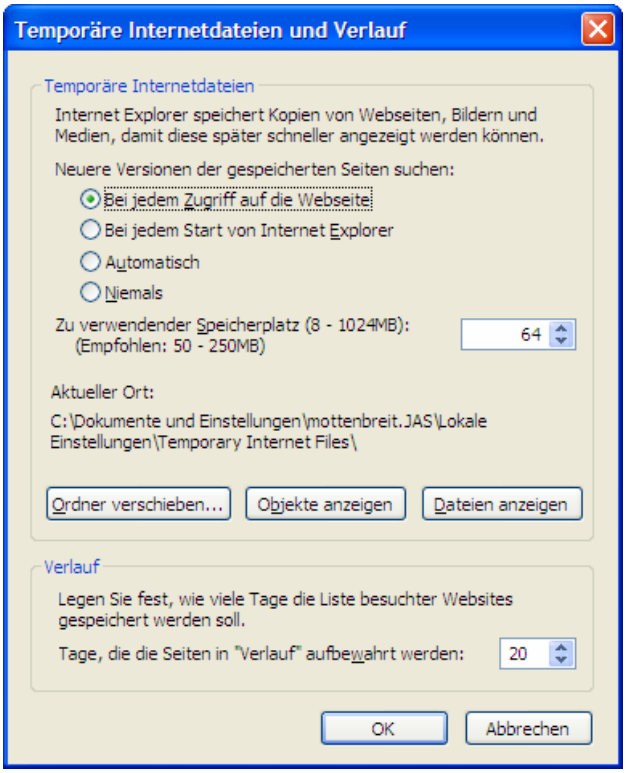
Finally you must declare the IE (and/or Firefox) as an exception for the **Windows® Firewall** in order to maintain proper UDP data transfer from and to the JAVA applet.



It is very important that you disable the caching features of the browser. Because the C8702 web pages are designed for operation in LANs. The strategy developed for surfing the internet (saving bandwidth and time to load pages employs caching of web site elements - the default set up of the browser) may cause confusion for a more technical application like the embedded controller module, because it uses a high degree of dynamically generated elements, which must be gathered from the web server instead of the PC memory or proxy servers.

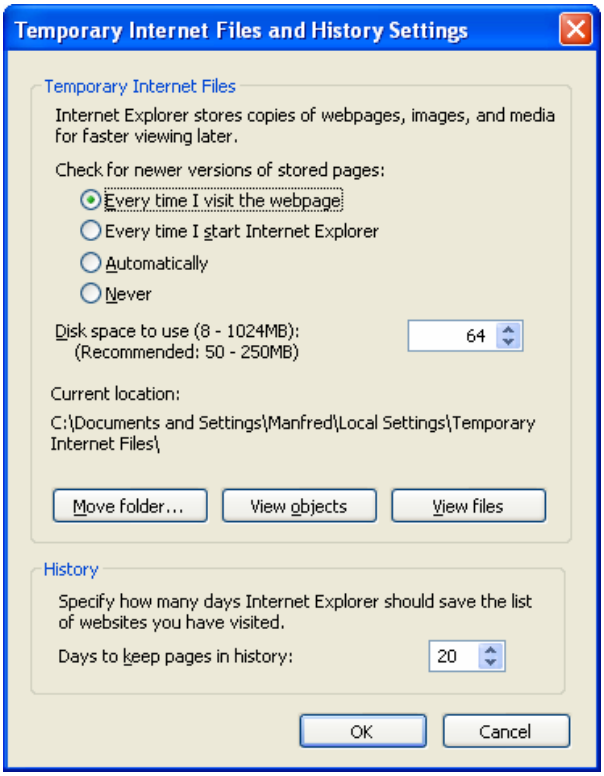
For IE 7 you must go to:

[German version] Extras > Internetoptionen > Allgemein > Browserverlauf > Einstellungen



«Neuere Versionen der gespeicherten Seiten suchen:»
set to «Bei jedem Zugriff auf die Webseite»

[English version] Tools > Internet Options >General > Browser history > Settings



«check for newer versions of stored pages »

set to «Every time I visist the webpage»

5.1.3 enable/disable password protection

In the factory default setting the Level Magic password protection is disabled. If you want to enable it press **1 (junger- terminal -> manage passwords)** and follow the instruction to enter the passwords for the operator and the administrator (description in 5.3.1. login). Later you can easily change the passwords with the help of the junger terminal or disable the password protection again.

5.1.4. Restore default factory settings

The factory default settings can be restored by menu item **3** (**junger terminal -> restore factory defaults).**

5.1.5. Reboot controller

The controller can be rebooted by menu item **4** (**junger terminal -> reboot)**.

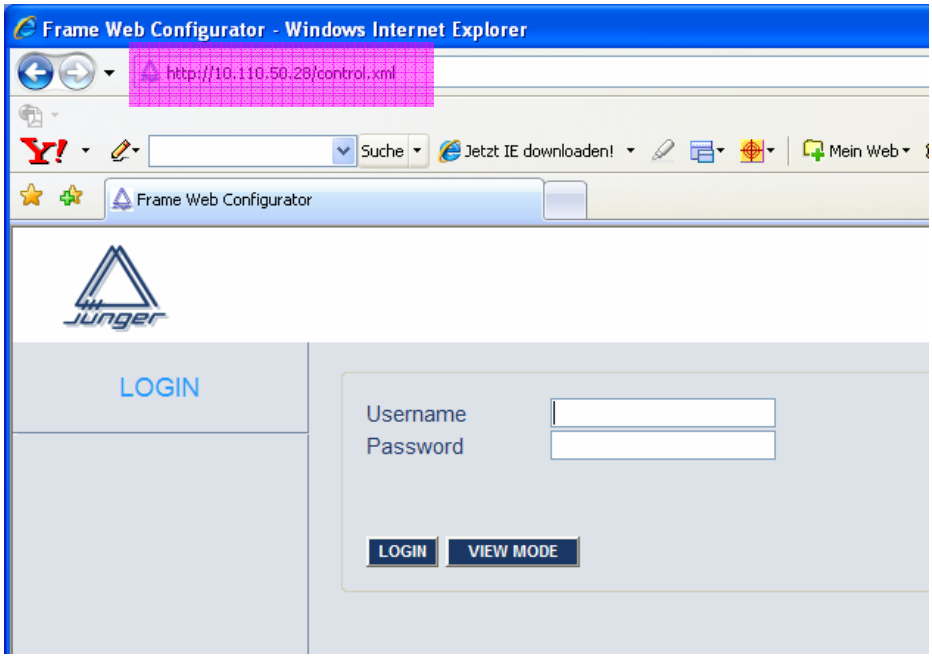
5.2. Web interface

5.2.1 Login

WEB INTERFACE

When you have set up communication between the device and your PC via junger Terminal, just type in the IP-adress of the device in your web browser and you will get access to the operation of the device.

When the password protection of the device is enabled via junger terminal program you get the following page. If the password protection is disabled you get onto the admin-mode automatically.



There are three different user modes to protect the device towards unauthorised operation.

VIEW – OPERATOR – ADMINISTARTOR

Usernames and passwords are set up via USB and the program, you received with the LM LT.

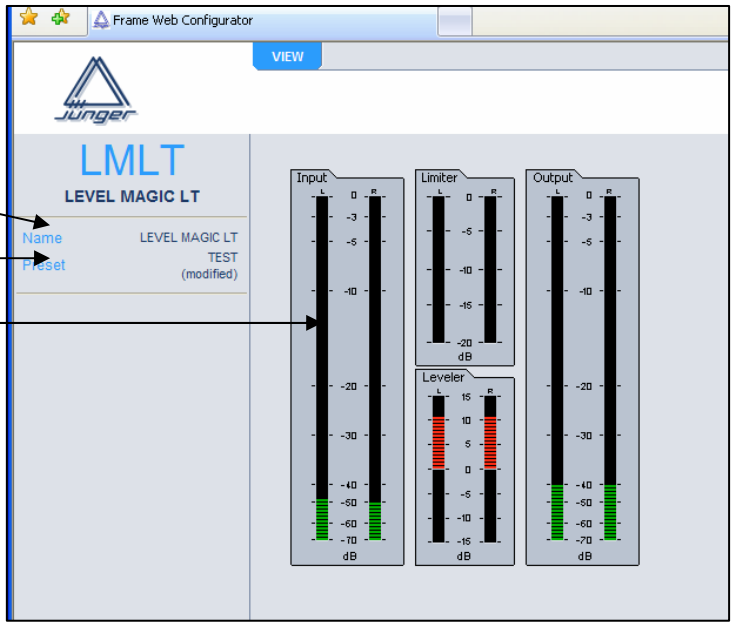
5. OPERATION

View mode

The **view mode** is activated by pressing the “view mode” – button.

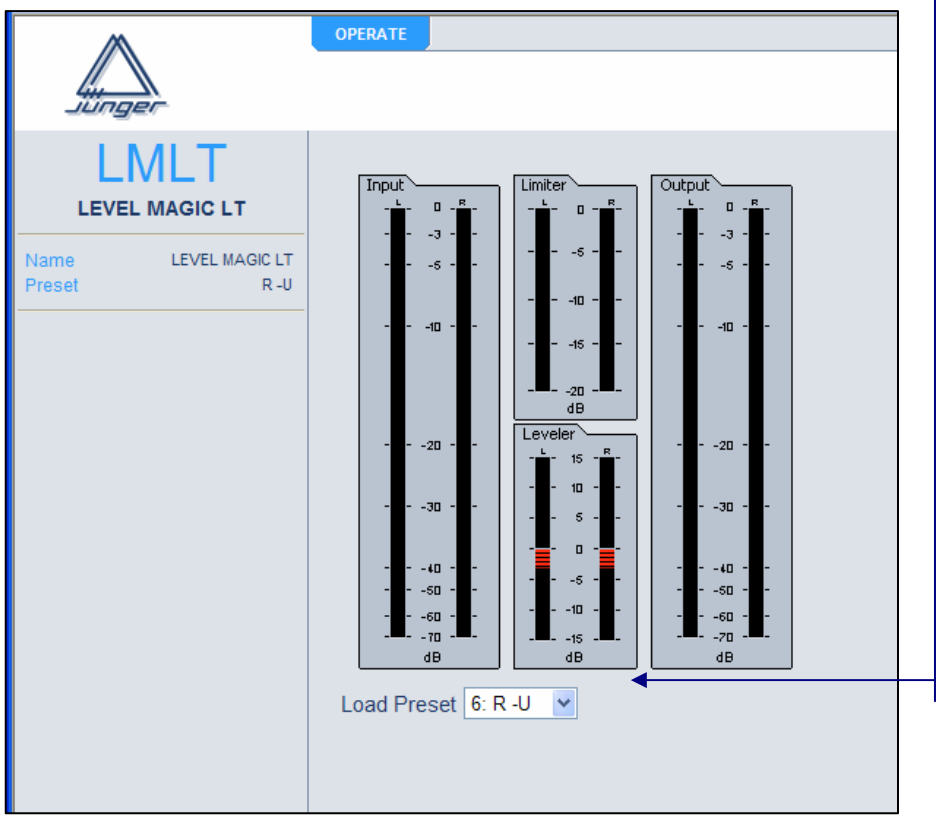
Here you can see

- the name of the device,
- the active preset
- the meters:
in/output
Limiter activity
Leveller-activity



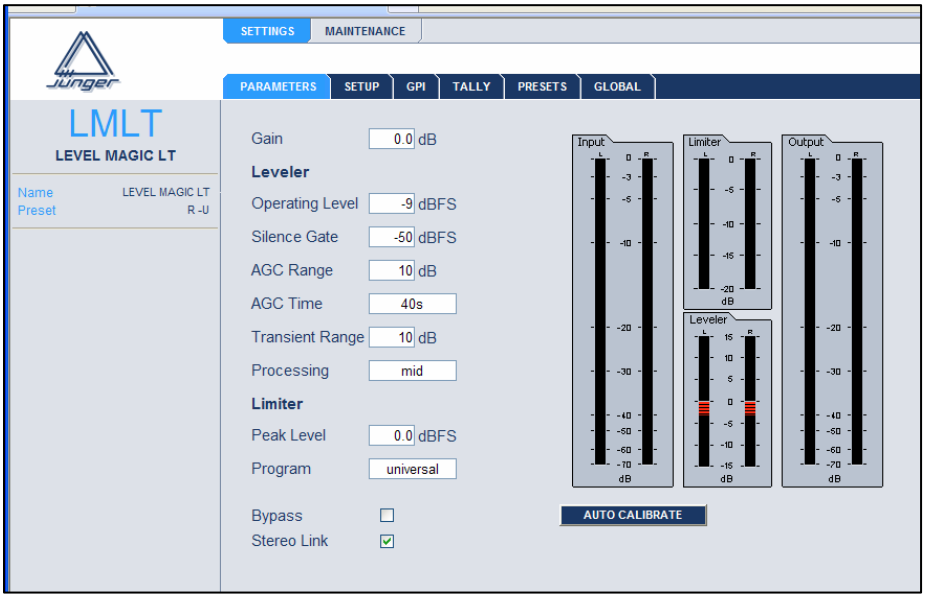
operator’s mode

When you have an **operator**’s user name and password
you get access to a page with all view’s information and you can load presets



When you have an **administrator**'s user name and password you get access to the setup of the device and it's parameters.

administrator's mode

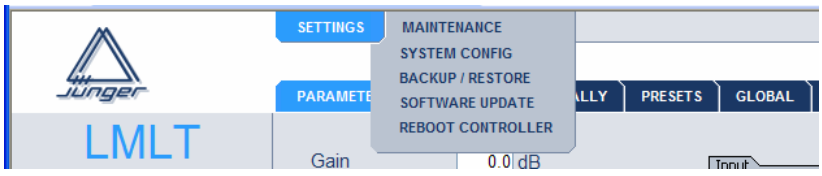


SETTINGS provides all device related settings

MAINTENANCE provides web controller functions

5.2.2 Maintenance

5.2.2. Maintenance



System configuration

Here you can change the network configuration of the Level Magic LT: IP-address, netmask, gateway
Changes are activated by rebooting the controller.

Back up / restore

Using the backup function a whole Level Magic LT-data set (all settings) is saved as a html-file into a folder of your choice. You can use this file to restore all the parameters of your device at a later date or to load this data set into

another device. It includes the same information as the backup file at the GLOBAL side (SETTINGS).

Software update

To update the software of the web interface controller you just have to load the update-image and press “update”. The image does also contain contingent updates for the controller of the device. This update will be automatically offered when you go to the “GLOBAL” page of the Level Magic LT.

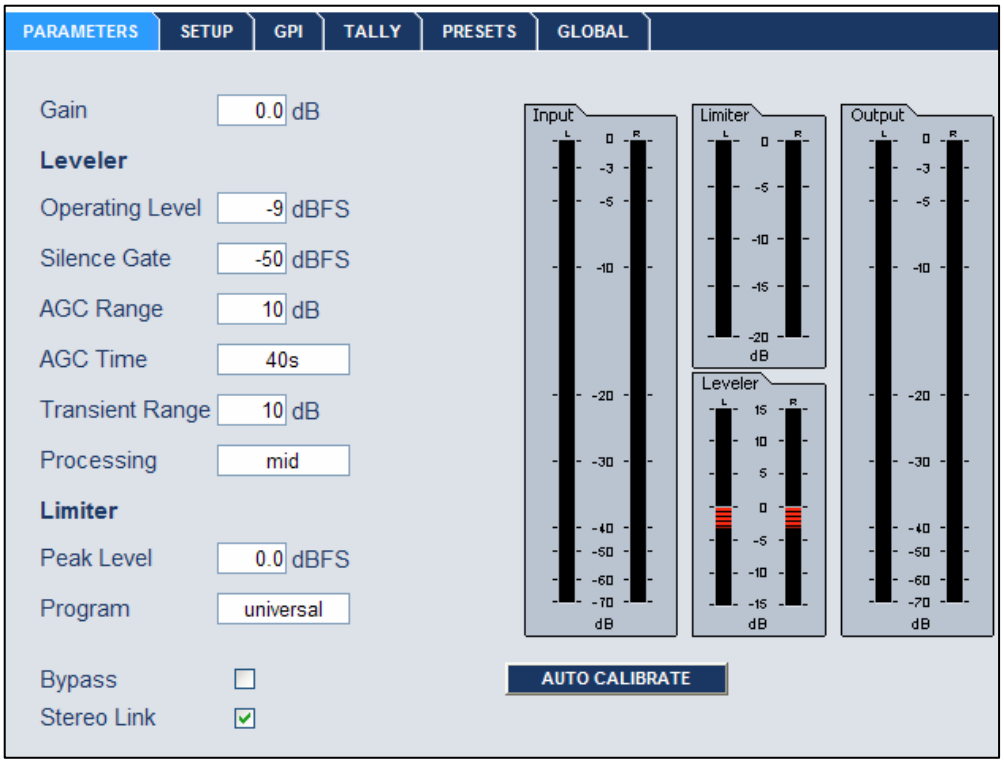
Reboot controller

Rebooting the web controller activates the changes you have made to the network configuration. If you have changed the IP address of the device, you are not able to reach the web interface after the reboot. You have to use the new address, of course!

5.2.3 Settings

5.2.3. Settings

Parameter



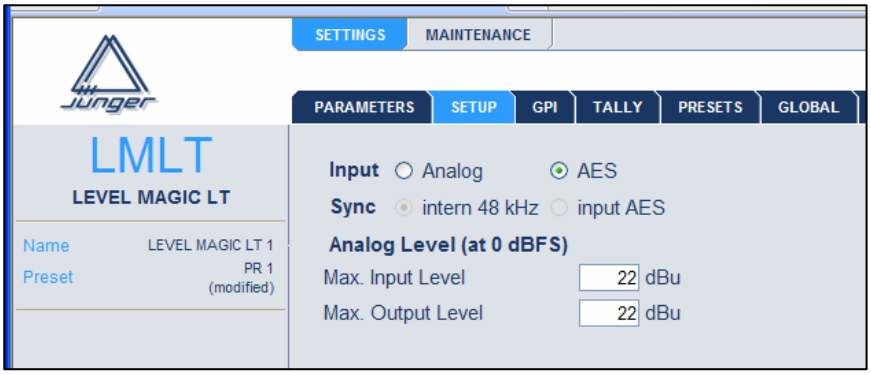
At the parameter side, Parameters can be modified and you have four meters showing in- and output level limiter and leveller-activity. All meters show relative values (peak not RMS!)) according to the setting of your reference peak level. You can activate the BYPASS and choose if the two channels should be linked as a stereo pair.
With the AUTO CALIBRATE function you can calibrate the OP-Level of your device. Put a calibrate tone on the input of the Level Magic LT (analog or digital) with the desired OP-Level. Press “AUTO CALIBRATE” and you will be asked to enable this function. After every calibration this function is locked.

Before you change Parameter settings please load one of the factory presets (PRESETS) that meets your application best. Make some tests with your audio and then modify the parameters to optimize the audio processing according to your requirements.

You find the parameter description and advice to adjustments in the Level Magic Introduction and reference guide (5.3).

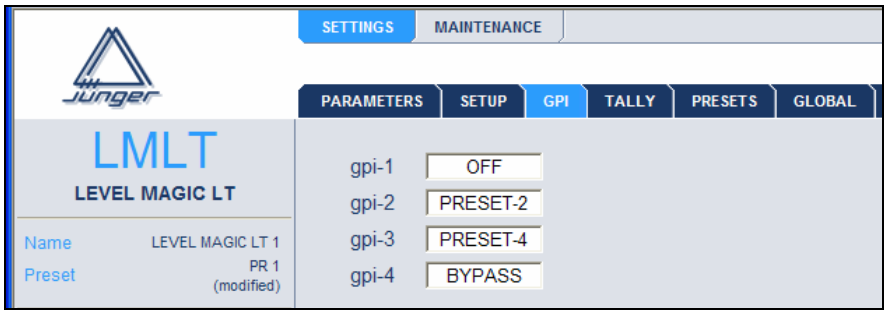
After having changed the parameters don’t forget to save them in one of the user presets (PR1-4).

Setup



Here you can choose the used input. If AES is chosen, the Level Magic LT synchronizes to the digital input. If you use the analogue input you have to choose if you want to work with the internal SYNC 48 kHz or with an external taken from the AES input.
The analogue input and output level referring to 0dBFS is set.

GPI

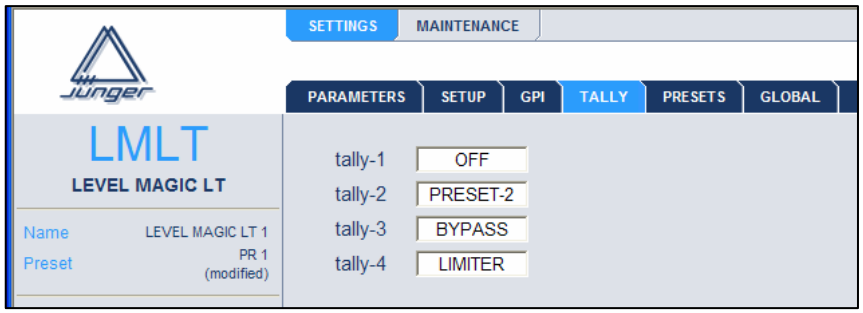


GPI 1-4 are set.

Provided settings:

OFF
PRESET 1
PRESET 2
PRESET 3
PRESET 4
STEREO
INPUT AES
BYPASS

TALLY

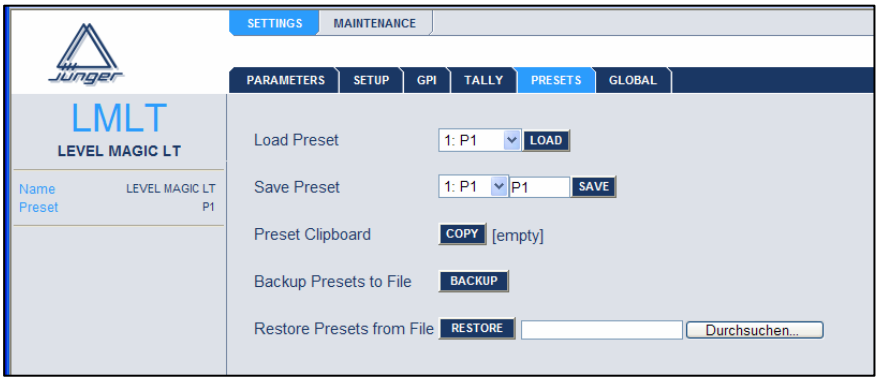


TALLY 1-4 are set.

Provided settings:

OFF
PRESET 1
PRESET 2
PRESET 3
PRESET 4
STEREO
LIMITER
CLIP
INPUT AES
BYPASS

PRESETS

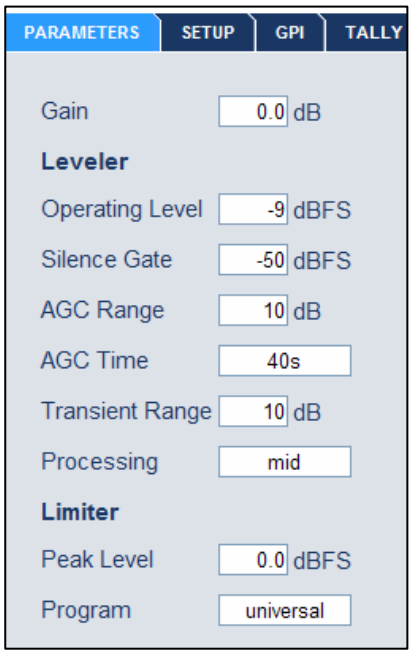


Presets can be loaded and modified presets can be saved in one of the 4 user presets (PR1-4). You find the settings of the parameters of the 6 factory presets in the factory preset list in the LEVEL MAGIC Introduction and reference guide.

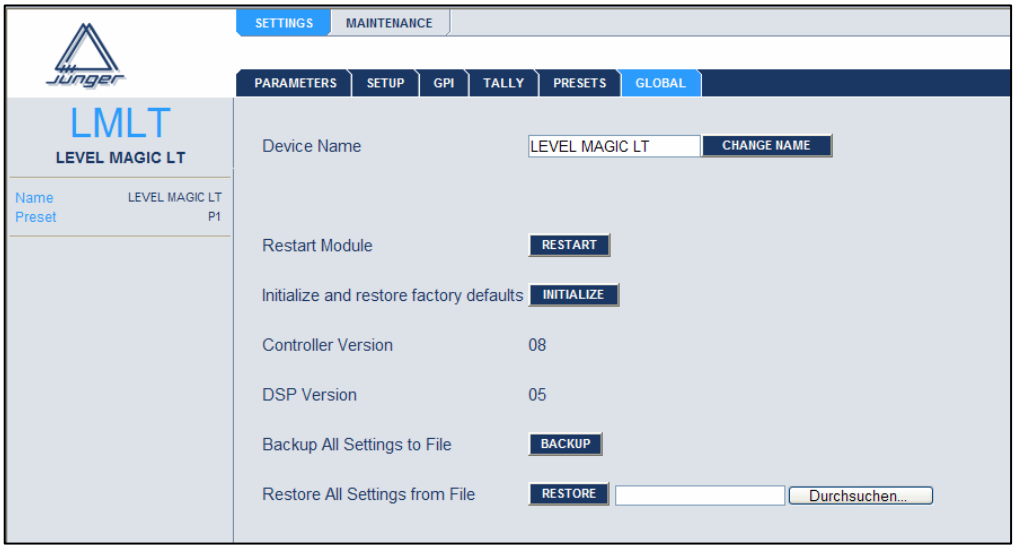
With the preset clipboard you can copy one preset set (user+factory presets) into another Level Magic LT device.

You should backup your presets to a file on your PC to be able to restore them in case that your device has to be initialized. Then it looses its user preset memory. You can also use the file to load the presets into another Level Magic LT device.

The following PARAMETERS of the four user presets are saved in the preset backup:



GLOBAL



At the GLOBAL side you can change the name of your device, restart the module and initialize the device. By Initialisation all user presets and setup settings of the device are overwritten! They can easily be regained by loading the global backup file.
Controller and DSP version are shown. If you do a web controller image update which includes a new software for the device controller, the update is offered here.

The backup at the GLOBAL side includes

PRESET PARAMETERS

BYPASS STEREO LINK

SETUP SETTINGS

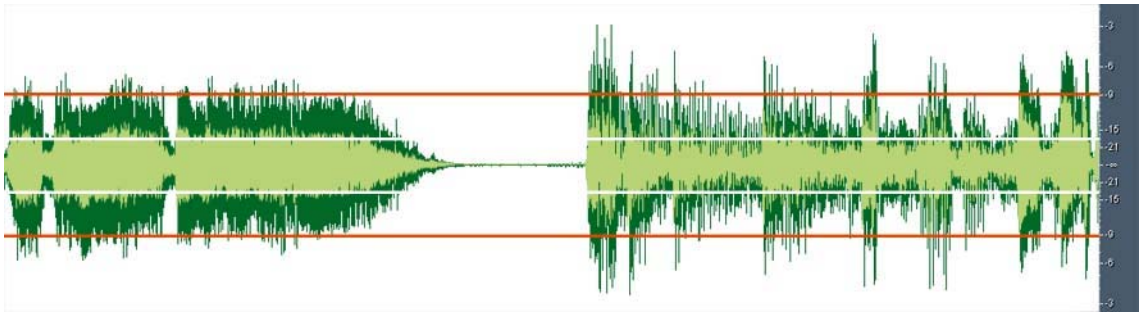
GPI-/TALLY-SETTINGS

DEVICE NAME

5.3
Level Magic

introduction and reference guide

LEVEL MAGIC™



Introduction & Reference guide

2. Release 2007
Junger Audio
Berlin

LEVEL MAGIC™

a sophisticated new adaptive level control algorithm capable of adjusting the right audio level from any source at any time.

Program suppliers and broadcasters alike have long been plagued by ‘surprise’ level changes when switching from one source to another. Not only peak levels but also average operating levels can vary wildly from one source to another, wreaking havoc with unattended operation.

Level Magic™ from Junger Audio relies on a sophisticated new adaptive level control algorithm capable of adjusting the right audio level from any source at any time. Automated Gain Control + Transient Processing + Peak Limiting for continuous unattended control of any program material.

> The audio signal is levelled to the desired Operating Level instantly!

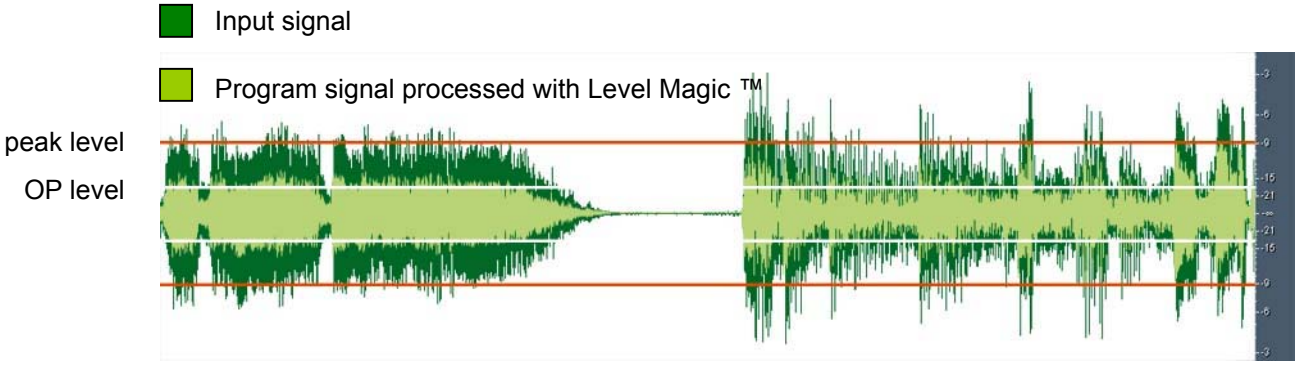
With Level Magic™, the desired Operating Level and Peak Level are dialled in once and thereafter, Level Magic™ will give continuous control, regardless of the source -- without touching the sound of the audio material. No breathing, no pumping, no spectral changes. Just well controlled dynamics!

> Unpleasant level jumps are eliminated

Level changes from different feeds, level differences between different program parts or even loudness problems in broadcasting – Level Magic™ will take care of them automatically, with a result the Listener will want to hear.
Major application fields include playout for multichannel broadcasting for satellite and cable distribution, program transfers with audio level changes, ingest stations and any situation where continuous control of audio level is important.

> Overmodulation is prevented by a Brickwall-Limiter

The Junger Audio brickwall limiter guarantees precise peak limiting without any distortion. For any kind of program signal and anytime.

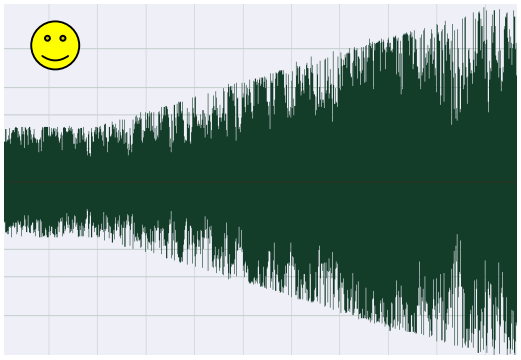


To understand the principle of the new algorithm and the adjustment of LEVEL MAGIC it is necessary to keep some psychoacoustic aspects in mind

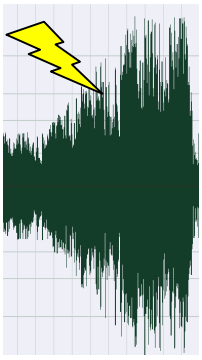
1. We do not perceive level changes if they happen in a certain period of time dependent on the absolute value of the level change.
   That means any slow level changes are not perceptable by the human ear.

   If for example the audio level rises from -20dBFS to -10dBFS within one minute you won't realize it, unless the level gets over an bearable value or the audio masks other sources you would like to listen to.

   But if the same level change happens in 10 seconds it will be very noticeable!



10dB /40 sec



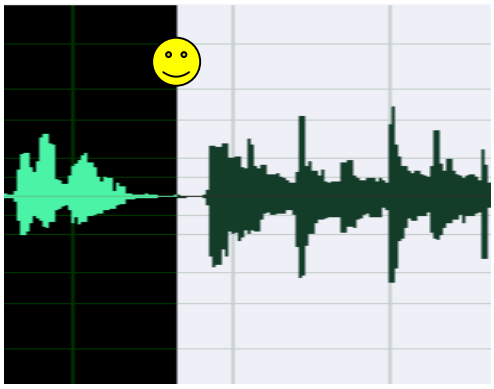
10dB /10 sec

That explains very clear why it is most important that AGC may not work too fast (1dB/4-5sec)!! A fast acting AGC would cause perceptable level changes. But we are looking to get an mostly inaudible levelling procedure.

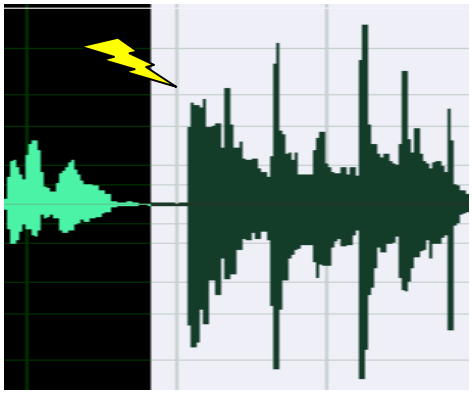
If a fast level adjustment is required (because of transients), this is done by the Transient Processor.

2. Level jumps rising over a certain absolute value are very unpleasant for our ears.

   Of course, it depends on the type of audio material and consequently on its loudness which absolute value of level change really annoys. A jumping level of 6dB is remarkable. A quick level change of 10…12dB becomes annoying for the human ear! So it's necessary to avoid major level changes. The transient processor of Level Magic is a solution for that.



3dB level difference



9dB level difference

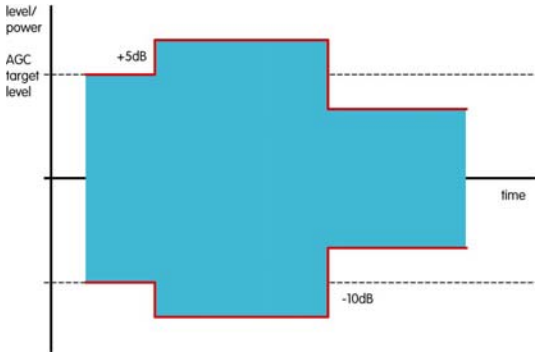
The transient processor immediately reduces or raises the level of a new program part so that level jumps over 10…12dB are eliminated.

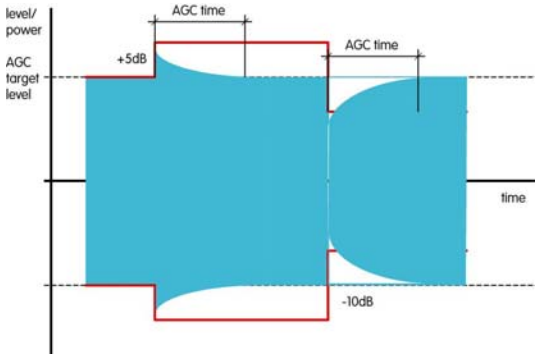
What makes the Level Magic different from previous dynamics processors?

A compressor/limiter combination of a known dynamics processor by Junger Audio is allways controlling the audio level in relation to the limiter threshold. In result no headroom is more existing and the signal is developed to reach a 100% output level. This characteristic is useful to reach maximum levelling for audio disk mastering as well as to reach 100% modulation for FM transmitters.

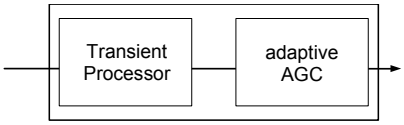
In compare to that Level Magic™ is serving two different levels – operating level and peak level. Between operating and peak level we will find the so called “headroom” for peaks that are still coming with the audio signal, even if this is level controlled related to the operating level. Level Magic™ is a unique algorithm to make automated audio level control possible. It is a combination of an adaptive AGC (automated gain control) with a transient processor and a brickwall limiter. The combination of an AGC circuit with a transient processor is the key to get a satisfying output level control for any kind of input level changes.

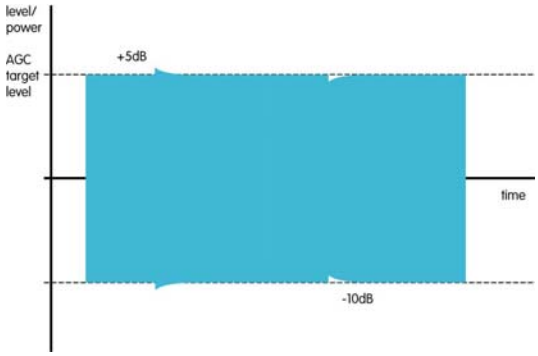
Input level change
The picture is showing a theoretical level change of +5dB and –5dB around operating level.





Working with AGC
In this picture a conventional AGC is used to adjust the output level. As we know the AGC must work slow to perform a mostly inaudible gain change. In result control on the output level is not giving a proper correction of the input level change.

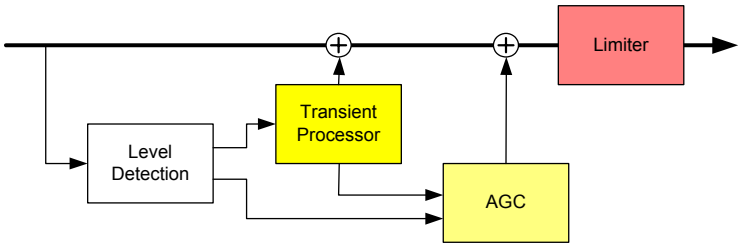




Level Magic™
Level Magic™ is a unique combination of a transient processor and an adaptive AGC process. The transient processor can fill the lack of fast level control left by the slow acting AGC. The total gain of Level Magic™ is the addition of the gain by the transient processor and the gain of the AGC.

Block Diagram

Level Magic™ is consisting of adaptive AGC + Transient Processor + Brickwall limiter. Independent on the leveller circuits the brickwall limiter is taking care on the peak level.
For the leveller (AGC + Transient Processor) Junger Audio is using a unique combination of QP and RMS level detectors to analyze the incoming audio signal. In comparing QP and RMS measurement results we can find out how much transients are coming in. Dependent on that the necessary resulting gain is controlled in relation between transient processor (fast process) and AGC (slow process).



The characteristic of the Level Magic™ level control is mostly determined by the settings of the Transient Processor. Transient processor is doing fast gain change and the AGC is doing slow gain change (depending on settings). Allways the AGC should be set in a way that the gain change is mostly inaudible (1dB per 5 seconds or slower). The Transient Processor should be set that incoming level jumps are reduced but originally dynamic range is not changed too much. As more possible gain by the Transient processor as more reduction of the dynamic range is coming with.

Parameters of **AGC**
Transient processor
Limiter & brief description

Parameter	Range	Description
LEVELLER		
Operating Level	-40…0dBFS	Desired **target level** for the levelling process. Reference Level for the Transient Processor and the AGC
AGC range	0…40dB	Determines the **maximum gain change** applied by the **AGC**. AGC Range must be bigger then the expected difference between the average input level and the operating level. If there is for example an average input level of -23dBFS and your OP-Level is -18dBFS, the AGC needs at least a range of 5dB. In most cases an AGC raneg of 10dB is a good choice
AGC time	10s…2h	Describes the **time of development** for the AGC to reach the maximum possible gain change (range value). **The ratio of gain change should never be faster then 3 seconds for 1 dB!!** We are recommending a setting of 4…5 seconds for 1dB gain change by the AGC. Therefore the AGC time is basically determined by the AGC range value. A range setting of 10 dB requires a time setting of minimum 40 seconds.
AGC gate	-60… -20dBFS	If the input level falls below this threshold level, the gain change of the Leveller freezes immediately. After appr. 20 seconds input level below silence gate the current gain change is slowly moving to the longterm average gain. On this way background noise is not raised in program breaks.
Transient program	soft/mid/hard	This parameter describes the characteristic of gain change by the transient processor. It has to be chosen dependent on your program genre. If there are just a few level changes or you want to keep the original dynamic range best (e.g. classical music), you have to choose “soft”. For mixed program “mid” should be best in most cases. And for live venues (sport etc.) with frequent unexpected level changes the adjustment “hard” is required.
Transient range	0…15dB	Determines the **maximum gain change** applied by the **Transient Processor** when there are fast input level changes. Large range values are reducing the dynamic range, especially in combination with the transient program “hard”
LIMITER		
Limiter Threshold (Peak Level)	0…-20dBFS	**Reference Level** for the **Brickwall** Limiter. The range between the Operating Level and the Peak Level is the level headroom and should be 6…9dB.
Limiter program	0…9	Characteristic of the limiter, mostly reflecting release of the limiter reduction. 0 – very fast, 9 – very slow.

Quick Start with Level Magic

For the first use of the Level Magic™ unit it's advisable to start with one of the factory presets (6 available). Some individually needed changes in the settings can be saved later in one of the 4 user presets.
- Select the preset meeting the application you are looking for mostly.
- Check if operating level and peak level are meeting your standard. If this is not the case readjust them and save your settings in one of the available user presets.
- If after having worked with different presets you are believing the desired setting between two factory presets compare them in the following table and look for the differences.

Allways take in mind that the balance of both levelling processes is determine the audio performance of the box mostly! As more available maximum gain by the transient processor as more boosting the level control is. As less available maximum gain by the transient processor as more sensible the level control will be applied.

Because of the use of adaptive controlled processing algorithms and considering the fact, that the AGC setting must meet the slow gain change requirement, just a few variations are left. Mostly changeable parameters to play with are Transient Processor Range in accordance with Transient Processor Program. The recommendation is:

Description of the processing result	Smooth levelling, preserving dramatic content	Normal standard level control	Boosting level control, decrease of dynamic range
Content application	Movie Sound, Classical Music	Any kind of audio material	Live audience, Speech dominated program
Transient Program	Soft	Mid	Hard
Transient Range	3…5	6…8	9…12
Limiter Program	6…8	3…5	1…2

Level Magic™ is creating the level headroom between the operating level and the peak level. For allmost any audio material used for broadcast transmission the headroom should be 6…9dB.
With this rule it should be easy to find the settings for the limiter. Even if the operating level is –20dBFS and therefore a technical headroom of 20dB is available it doesn't make sense to use it. More than 10dB headroom are increasing the dynamic range of the audio material for broadcast transmission too much.

Overview on the **Factory Presets**

	Factory presets					
	Radio Classical	TV Movie	TV Live	Radio Speech	Radio uni-versal	TV universal
Parameter						
LEVELLER	ON	ON	ON	ON	ON	ON
OP-level	**-9dBFS**	**-18dBFS**	**-18dBFS**	**-9dBFS**	**-9dBFS**	**-18dBFS**
AGC Range	10dB	15dB	10dB	10dB	10dB	10dB
AGC Gate	-60dBFS	-50dBFS	-50dBFS	-40dBFS	-50dBFS	-50dBFS
AGC Time	2min	2min	20s	20s	40s	40s
Transient Program	Soft	Mid	Hard	Hard	Mid	Mid
Transient Range	3dB	6dB	10dB	15dB	10dB	10dB
LIMITER	ON	ON	ON	ON	ON	ON
LIMITER Threshold	0dBFS	-9dBFS	-9dBFS	0dBFS	0dBFS	-9dBFS
LIMITER Program	6	4	1	2	4	4
Max. total gain change	13dB	21dB	20dB	25dB	20dB	20dB

TECHNICAL SPECIFICATIONS

6

digital signal processing

Sample rate	48 kHz (internal)
Audio data format	24 bit

in- / outputs

ANALOG IN/OUT

ANALOG IN

Resolution	24bit
Dynamic range	110dB (RMS) 114dB (A-weighted)
THD+N	<0.002% @ max. input level
Frequency response	20Hz...22kHz (FS=48kHz) (+/-0.2dB)
CMRR	– 70dB @ 50Hz
Max. input level	+22dBu @ 0dBFS
Input impedance	10 kΩ balanced
Connector	XLR, 1-screen, 2-live, 3-return

ANALOG OUT

Resolution	24bit
Dynamic range	108dB (RMS) 110dB (A-weighted)
THD+N	<0.002% @ max. input level
Frequency response	20Hz...20kHz (FS=48kHz) (+/-0.5dB)
Max. output level	+22dBu @ 0dBFS
Output impedance	50Ω, balanced
Connector	XLR, 1-screen, 2-live, 3-return

AES Digital IN/OUT

AES/EBU

Connector	XLR, 110Ω balanced
Input format	AES professional and AES consumer
Output format	Same as input format

channel status bits for the output signal:
(independent from the input)

-professional
- 48 kHz sample frequency
- 2ch mode
- 24 bit audio

6. TECHNICAL SPECIFICATIONS

Remote Control

REMOTE

TCP/IP Ethernet connection

GPI parallel remote

Level	Opto coupler, 3..24V control voltage
Connector	9 pin female DSub

Tally Out

Level	Relay contact
Connector	9 pin SUB-D female

USB	1.0	connector for serial data Transfer

General

Power consumption	Appr. 15 VA
Dimensions	19“, 1 RU, 215 mm depth
Weight	Appr. 3 kg

WARRANTY AND SERVICE INFORMATION

7

JÜNGER AUDIO grants a two-year warranty on the

The LEVEL MAGIC™ LT Digital Audio Level Processor

If the unit has to be serviced, please send it, ideally in the original box, to:

JÜNGER AUDIO - Studiotechnik GmbH

Justus-von-Liebig-Str. 7

D - 12489 Berlin
GERMANY

Tel.: (*49) -30-677721-0
Fax.: (*49) -30-677721-46

QUICK START with Level Magic™ LT

8

This description is a guideline.
You also read the rest of the manual --- carefully. Otherwise you *will* get into trouble

➔ Unpack the Level Magic™ Digital Audio Level Processor Unit and make sure that has not been damaged during shipment. If it has been damaged please call Jünger Audio at once for further procedure.

The Level Magic LT is operated via Web Interface; so first you have to assign a valid IP-address (of your LAN/PC) to the Unit.

➔ Install the Jünger terminal program from the CD-ROM included with the Unit.
➔ Connect the Level Magic to your PC via USB and change the network configuration via the Jünger terminal program.

➔ Reboot the web controller via terminal programm (be careful not to **initialize** the web controller – terminal: restore factory defaults – because then your network configuration will be reset to the factory default address

➔ Connect the Level Magic LT via Ethernet cable to your LAN/PC (If you want instead to have a direct connection between the LM LTand your PC you will need an Ethernet crossover cable to connect the two!)

➔ Open your Web Browser, type in the (new) Level Magic LT IP-address and you will be able to do all the needed setup

➔ When you are making the audio connections to the unit power off the LM-LT and all audio devices which shall be connected to it!

KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY

Geräteart : **digitaler Audio-Level Prozessor**
Type of equipment : **digital audio level processor**

Produkt / Product : **Level Magic LT**

Das bezeichnete Produkt stimmt mit den Vorschriften folgender EU-Richtlinie(n) überein:
The aforementioned product complies with the following Europaen Council Directive(s):

89/336/EWG (geändert durch 91/263/EWG und 92/31/EWG)
(changed by 91/263/EEC and 92/31/EEC)
Richtlinie der Rates zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten über die elektromagnetische Verträglichkeit
Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility

73/23/EWG (geändert durch 93/68/EWG)
(changed by 93/68/EEC)
Richtlinie des Rates vom 19. Februar 1973 betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen
Council Directive of February 19th 1973 concerning electircal equipment for operation within certain voltage limits

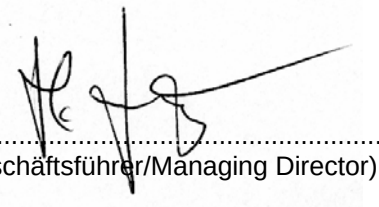
Zur vollständigen Einhaltung dieser Richtlinie(n) wurden folgende Normen herangezogen:
To fully comply with this(these) Directive(s), the following standards have been used:

EN 55022 : 1987
EN 50082-1 : 1993
EN 60065 : 2002

Dieser Erklärung liegen zugrunde : Prüfbericht(e) des EMV-Prüflabors
Interne Vorschriften zur Sicherheits-Prüfung
This certification is based on : Test report(s) generated by EMC-test laboratory
Internal regulations for safety check

MEB Messelektronik Berlin : Kalibrier- und Prüflabor
accredited EMC laboratory

Aussteller / Holder of certificate : Jünger Audio Studiotechnik GmbH
Justus-von-Liebig-Strasse 7
D - 12489 Berlin



Berlin, 24.07.2003 .....
(Ort/Place) (Datum/Date) (Herbert Jünger, Geschäftsführer/Managing Director)

LEVEL MAGIC ™

automated level control

transparent sound

junger audio

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