t.c. electronic
ULTIMATE SOUND MACHINES

DBMAX - V 2.60
DIGITAL BROADCAST MAXIMIZER

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TC Electronic, Sindalsvej 34, DK-8240 Risskov - tcdk@tcelectronic.com   English version   Rev 2.02 - SW - V 2.60
Prod. No: 606054122

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QUICK START

We recommend you read the entire manual before using the DBMAX, but if you're anxious to get started we suggest you take the following steps in the described sequence.

1   Connect analog and/or digital I/O and power to the unit. The DBMAX will adapt to the power being used in your area without you having to select a voltage.

2   Turn on the POWER switch at the rear, and press the POWER key on the front.

3   On LCD IN page 1, select analog, S/PDIF or AES/EBU Input.

4   Press the REF. LEVELS key and set your I/O level conditions:

4.1 If you use analog Inputs or Outputs, adjust the analog level required for digital full scale by selecting a proper value for the In Level parameter. When a correct In Level is selected, the red LEDs on the INPUT meter should never light up, and indication should be in the -18 to -6dB range.

4.2 Your normal operating level, typically the level at which you would want a calibration tone, may be set as Reference Level. In a broadcast environment, the Reference Level would normally be set 18-20dB below your In Level. If you only want to relate to digital full scale, turn the Reference Level all the way up.

4.3 The Abs.Peak Output setting determines the maximum instant peak Output level from the DBMAX. If you work against digital peak meters or in transmission, the setting should be spot on. If you work in an environment depending on analog PPM meters, this setting should be 3-4 dB above the maximum level allowed with the meter. If you work against VU meters, the setting should be 12-20dB above the 0VU level.

5.   Press the WIZARD key and select the type of limiting/compression you want by using the PARAMETER keys and the ADJUST wheel.

6.   Press the OK key. Play some program material and leave the Wizard working while you are playing a soft part and a loud part of the type of signal the DBMAX will be processing. 10 seconds of each will do.

7.   Press the OK key again, and the DBMAX has loaded a best fit parameter setting for your application and source material.

8.   If required, go to the COM block in the MAIN PAGE, and adjust the More/Less setting to suit your taste. Turning the control to Less makes the unit behave as a Limiter. Turning the control to More makes the unit behave like a maximizer.

9.   No more overs. Enjoy!

INTRODUCTION

Congratulations on the purchase of your new DBMAX.
We hope that you will have as much pleasure using it as we had making it.
The DBMAX V2.02 is the result of hard work by TC Electronic's skilled developers, based upon the experience of some of the best qualified transmission engineers in the business. The DBMAX V2.02 is TC Electronic's second generation of broadcast compressors. Stuffed with all the necessary tools, a strong collection of presets as well as a selection of predefined Level setups, the DBMAX could be a difficult unit to operate. But nicely wrapped in TC's award winning highly intuitive design, you will soon be ready to operate it.
We invite you to have your Input/Output and reference level specifications included in later software releases. Other DBMAX owners will then very easily comply with your specifications when delivering program material to your station or production house.
For suggestions please contact TC Electronic at: *info@tcelectronic.com*
Please keep informed on the latest updates either via our internet site at www.tcelectronic.com
or contact TC Electronic directly.

General features in the DBMAX version 2.02
Versatile multi-band Compressor/Limiter/Expander with switchable architecture between 1 and 5 bands
Minimum distortion algorithms utilizing 24 and 48 bit processing
New Less/More for control of multi-band compression
Processing at any Sample Rate between 32 and 48kHz
Relay bypass of analog I/O on power-down
Unlock detection of digital Input
Audio bandwidth to 24kHz, or variable lo-pass filtered for FM transmission
24 bit resolution AD and DA converters and built in optional Sample Rate converter
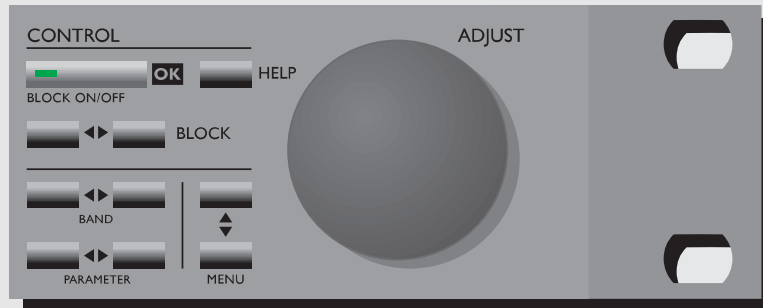
Useful features for Production
Level settings for a number of Radio and TV stations
5-band parametric EQ insert
Stereo Enhancer insert
90° mono insert
MS Decoding insert
MS Encoding insert
Dynamic EQ and De-esser insert
Production Final Limiter providing PPM attack response
Production Final Limiter providing adjustable Soft-Clip
Dedicated presets for Film and Post Pro Mastering
Dedicated presets for Production Recording
Dedicated presets for CD Mastering

Useful features for Continuity and Transmission
Final TX Limiter providing Emphasis compensated HF limiting
Final TX Limiter providing adjustable Soft-Clip
RS485 remote control
90° mono insert
AGC insert
Stereo Enhancer insert
5-band parametric EQ insert
Dynamic EQ and De-esser insert
Dedicated presets for Continuity Limiting
Dedicated presets for Continuity AGC (1-5 bands)
Dedicated presets for gentle Transmission processing
Dedicated presets for aggressive Transmission processing

FRONT PANEL

ELECTRONIC POWER SWITCH
»Easy touch«
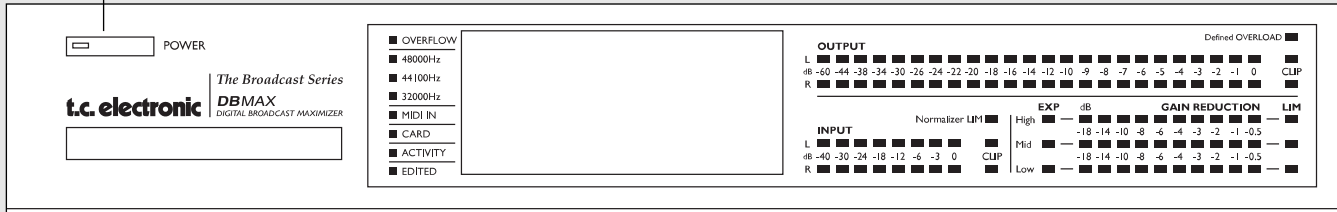*Keep pressed for more than 2 seconds to turn device off.*

DEFINED OVERLOAD
User defined overload LED.

OUTPUT PPM
High resolution meters.

CLIP LED
Indicates that Output is clipped.

POWER

The Broadcast Series
t.c. electronic | **DB**MAX
DIGITAL BROADCAST MAXIMIZER

OVERFLOW
48000Hz
44100Hz
32000Hz
MIDI IN
CARD
ACTIVITY
EDITED

OUTPUT
L
dB -60 -44 -38 -34 -30 -26 -24 -22 -20 -18 -16 -14 -12 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0   CLIP
R

Defined OVERLOAD

Normalizer LIM   High   **EXP   dB   GAIN REDUCTION   LIM**
-18 -14 -10 -8 -6 -4 -3 -2 -0.5

INPUT
L
dB -40 -30 -24 -18 -12 -6 -3 0   CLIP   Mid   -18 -14 -10 -8 -6 -4 -3 -2 -0.5
R   Low

PC CARD SLOT
Presets may be copied to/from a standard PCMCIA/PC-CARD memory card.

INDICATORS

OVERLOAD LED
Lights up if internal overload occurs.

INPUT SAMPLE RATE INDICATOR
48000 Hz
44100 Hz
32000 Hz

MIDI IN LED
MIDI or RS485 receive indicator.

CARD LED
Indicates presence of a valid memory card.

ACTIVITY LED
Indicates when a calculation is performed.

EDITED LED
Indicates that the preset has been edited.

INPUT PPM

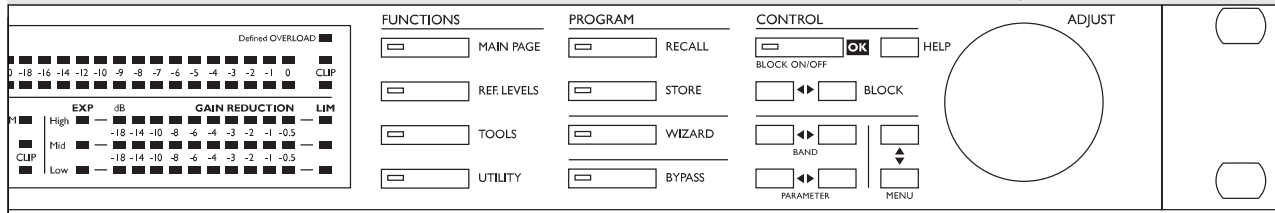**EXPANDER ACTIVE INDICATORS**

GAIN REDUCTION METERS
High - Indicating the max gain reduction in the two high freq.bands.

Mid - Indicating the max gain reduction in the mid freq. bands.

Low - Indicating the max gain reduction in the two lower bands.

LIMIT LEDS

FRONT PANEL

ADJUST wheel
Sets parameter values and preset numbers.

FUNCTIONS SECTION

MAIN PAGE
This key allows you to edit the entire signal flow, from Input to Output.

REF. LEVELS
All I/O levels are set here.

TOOLS
This key gives you access to a lot of useful tools for optimizing your material.

UTILITY
Security, Timing calculations, Memory management and others.

PROGRAM SECTION

RECALL
Recall presets.

STORE
Store and name presets.

WIZARD
The Wizard guides you thru some of the hard work of finding the correct settings of essential parameters.

BYPASS
Bypass the signal processing.

CONTROL SECTION

OK
Confirm operations and switch individual blocks on/off.

HELP & LOCK
Get help on selected display by pressing the HELP key. Press and hold to activate/deactivate Front Panel Lock function.

BLOCK < >
Select which block to edit on the Main page.

MENU *up/down*
Vertically oriented menu selector.
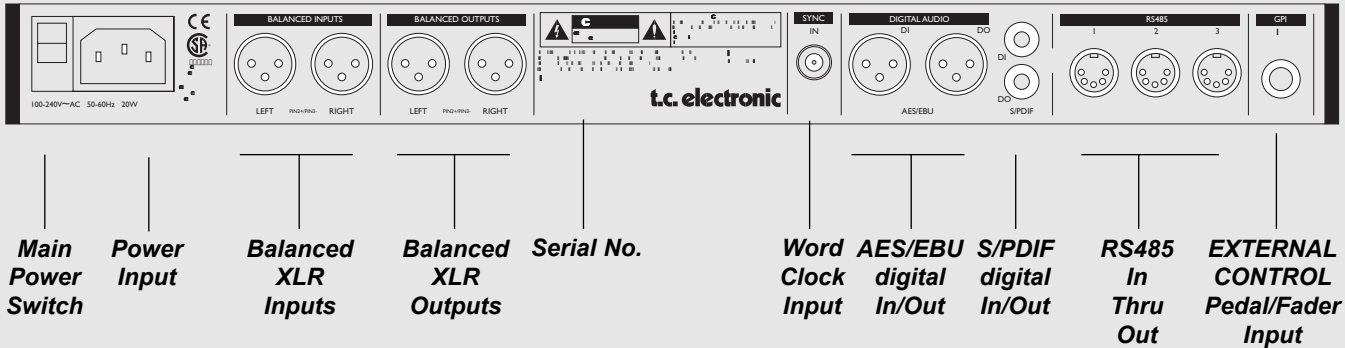
PARAMETER < >
Moves horizontally for selection of parameter to be modified.

BAND < >
Select between the five bands on the Com/Lim/Exp pages.
On the EQ page, the BAND keys select which of the five EQ filters are displayed and ready for modification.

REAR PANEL

Main Power Switch	Power Input	Balanced XLR Inputs	Balanced XLR Outputs	Serial No.	Word Clock Input	AES/EBU digital In/Out	S/PDIF digital In/Out	RS485 In Thru Out	EXTERNAL CONTROL Pedal/Fader Input

NOTES:

To comply with international regulations, we have also added a rear panel POWER switch.
You don't need to use the POWER switch on the rear panel. Use the front panel POWER switch instead.

Pin 2 is »hot« on all XLR's (IEC and AES standards). For soldering instructions please refer to page 55.

If you are connecting the DBMAX to unbalanced equipment, you must tie pins 1 and 3 together in the cable ends away from the DBMAX.
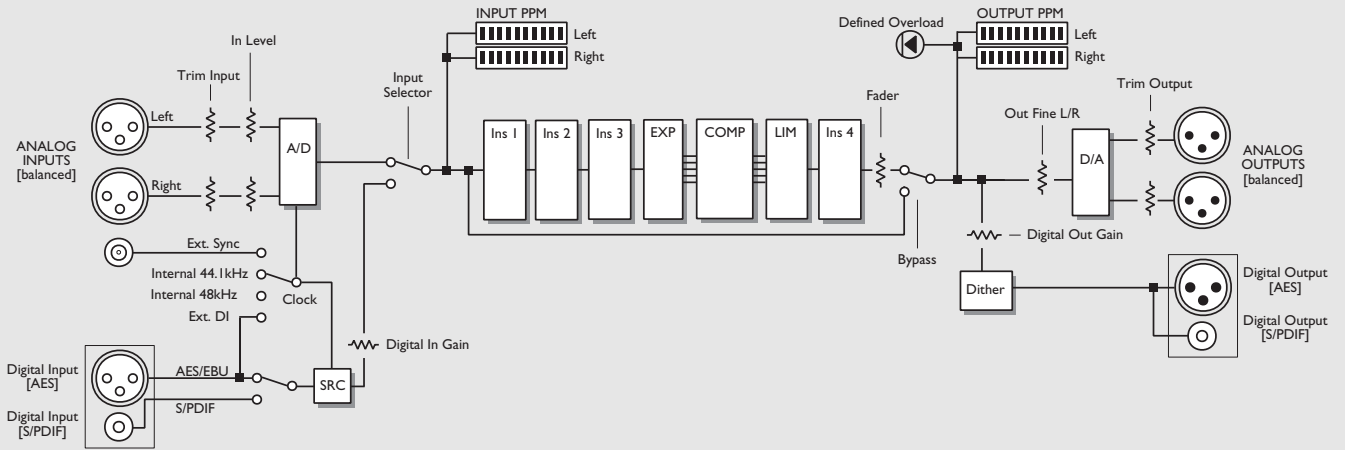
NOTE!
Pins 1 and 3 on the DIN connectors serve as RS485 connection. Therefore, if you are connecting the unit to other equipment that use these pins, please make sure to use 3-wire standard MIDI type cable (not a five wire MIDI-PLUS type).

If you want to use the Pedal Input, make sure it is a momentary type.

SIGNAL FLOW

DBMAX

DBMAX SETUP

The DBMAX is carefully designed to optimize or limit the overall level and enhance the energy in your material.
The use of the five band Compressor, Limiter and Expander makes the dynamics section of the DBMAX very flexible, while maintaining the fidelity of the original material. The dynamics section, in combination with a Normalizer, AGC, EQ, De-esser etc. makes the DBMAX a very powerful tool for optimizing the current signal.
Because the DBMAX can be used in different applications, we propose a few different setups.

Radio Production & Transmission applications

DAB production or FM Production suite
The two applications for the DBMAX in this configuration are:

1. The DBMAX can be inserted pre master, to optimize the production.

2. The DBMAX can be inserted post master to emulate the signal processing in transmission.
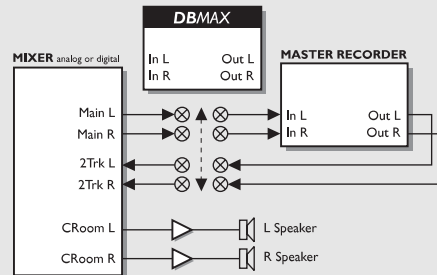
Transmission
The two applications for the DBMAX in a transmission situation:

1. Digital Broadcast: DBMAX optimizing, limiting and equalizing the signal for digital Audio Broadcast.

2. FM broadcast: DBMAX optimizing, limiting and equalizing the signal in proportion to the current pre-emphasis.

DBMAX SETUP

TV Production & Transmission applications

Surround Production Suite

The two applications for the DBMAX in this configuration are:

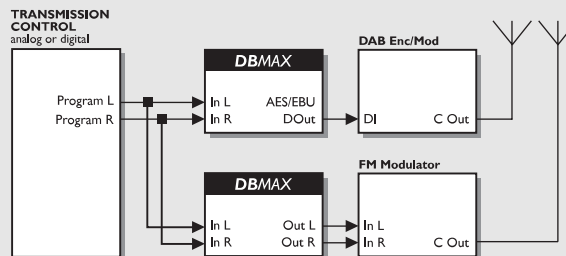1. The DBMAX can be inserted pre master, to optimize the production.
   Note: Adjusting the L/R balance can cause serious changes to the surround encoded signal.

2. The DBMAX can be inserted post master to emulate the signal processing in transmission.
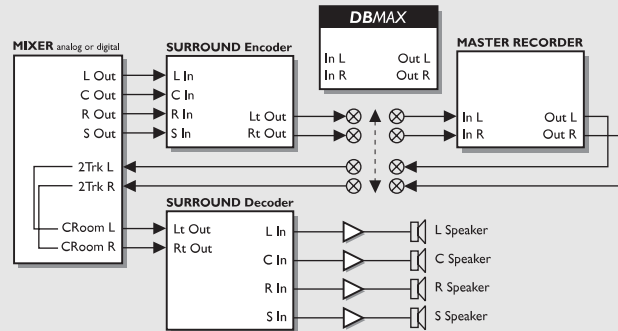
TV continuity/Transmission

The two applications for the DBMAX in a transmission situation are:

1. Digital Sound: DBMAX optimizing, limiting and equalizing the signal for NICAM (or other systems) using the wordclock as ext. sync.

2. FM Sound: DBMAX optimizing, limiting and equalizing the signal in proportion to the current pre-emphasis, generating mono (0º or 90º).
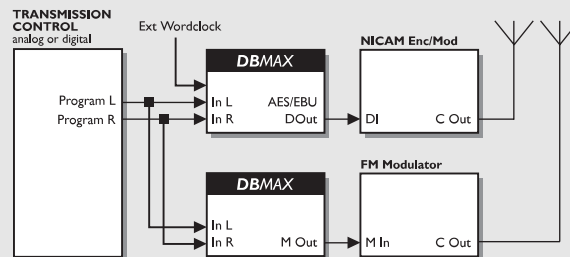
```
I/O Levels
SETUP:
▶Load Setup     : PRESS OK
 Save Setup     : PRESS OK
OPERATING LEVELS:
 Ref.Level      :    0dBu
       (dBFS)   :   -18dB
 Abs.Peak max   :   +9dBu
       (dBFS)   :    -9dB
ANALOG LEVELS:
 InLevel 0dBFS: +18dBu
 Trim Input     :     0dB
 Trim Output    :     0dB
DIGITAL LEVELS:
 Input Gain     :     0dB
 Output Gain    :     0dB
DEFINED OVERLOAD LED:
 Overload       :   +6dBu
       (dBFS)   :   -12dB
 @Integration   :    10ms
FRONT PANEL OUTPUT METERS:
 Ref            :   0dBFS
 Peak Hold      :      1s
 ClipLed def.: 4sampl.
BYPASS DEFINITION:
 Bypass using   :     1:1
```

The Reference level settings are the heart of the DBMAX. If these parameters are not set properly, the DBMAX may not perform correctly. So please take the time to go through these level settings and make sure they are set correctly.

The DBMAX is prepared to match several different predefined Reference Level setups. These setups could be considered as "level presets". In addition to these presets you can store four setups of your own.

Basic operation
- Use the MENU keys to select parameter.
- Use the ADJUST wheel to change value.

Setup
Load Setup
- Select "Load Setup" by pressing the grey OK key, and scroll through the list using the MENU keys.
- Select an environment/application resembling your own, and press OK.

Save Setup
It is possible to store four different custom user setups.
- Place the cursor next to "Save Setup" using the MENU keys.
- Press OK and use the MENU keys to select the location where you want to store the setup.
- Confirm with OK to store the preset with the same name or change the name before storing.
To change the name before storing:
- Use the PARAMETER keys to select letter-position and the ADJUST wheel to select letter.
- When you have the desired name in the display, press OK to store the setup with the new name.

All parameters in Ref. Levels will be saved.

Operating Levels
General advice
If you use analog Inputs or Outputs, first adjust the analog levels In Level setting to define the analog level for digital full scale (FS). The Ref. Levels setting should be adjusted for nominal signal level, which is both expressed in dBFS (digital) and dBu (analog). The Abs. Peak max setting should be adjusted for maximum instant peak permitted Output level.

REFERENCE LEVELS

Ref. Level
With Reference level you can set the reference point of the Compressor to eg. +4dBu. All Thresholds, except the Limiter Thresholds, are relative to this parameter.
The Reference level parameter is adjustable in dBu and dBFS.

Abs. Peak max
Sets the hardclip point of the DBMAX. Absolute peak means that notching occurs above this level digitally.
Absolute Peak Max. is adjustable in dBu and dBFS.

Analog Levels

In Level 0dBFS
Sets the dBu level you want to equal to 0dBFS (Full Scale), i.e. setting this parameter to +18dBu, means that when you are sending +18 dBu out of your desk, the DBMAX will be showing 0dBFS.
It is very important that you set this parameter correctly as all other dBu levels are relative to it.

Trim Input
This parameter trims the level of the analog Input for digital full scale (FS). Correct trimming optimizes the 24 bit AD converters performance in conjunction with the trimming of the Output parameters.

Trim Output
Trims the analog Output level. This parameter may be trimmed in 1dB steps.

Digital Levels

Input Gain
Sets the digital Input level. Use this if you need to trim a source to a new level. A typical situation could be trimming down the digital Output of a CD-player.
All trims may be stored using the Save setup command.

Output Gain
Sets the digital Output level.

Define Overload LED

Overload
This parameter allows you to custom-define the DEFINE LED. The Overload level can be set anywhere between -30 dBFS and 0 dBFS.
The Overload parameter is adjustable in dBu and dBFS.

Integration
To simulate different types of meters, the defined overload can work in proportion to an integration time. Digital meters have an integration time of 0ms where analog meters typically have an integration time of 10ms.
The Integration time can be set to 0 ms, 1 ms, and 10 ms.

Front Panel Output Meters

Ref
You can set the Output meters to refer to digital Full Scale (dBFS), which is the default, or Clip which means that the meters are referring to "Absolute Peak" as 0 dB. When set to Clip you will take full advantage from the Output meter.

Peak Hold
Set the desired Peak-Hold time with this parameter.
Choose between Off, 1, 2, 5, or 10 seconds.

Clip LED def.
You are able to define when you want the CLIP LEDs to be activated. Choose the number of consecutive samples to be at 0dbFS before the CLIP LEDs are activated.

Bypass Definition

Att.
When bypassing the DBMAX in this mode the signal will not exceed the Abs. peak max level set in the Ref. Levels - I/O Levels menu.

1:1
Use this setting if you want to bypass the signal but apply Dither and delay.

Thru
Use the Thru setting to bypass the entire signal bit by bit.

REFERENCE LEVELS

```
OPERATING LEVELS:
─────────────────────────
Ref. Level       :      0dBu
        (dBFS)   :    -18dB
Abs. Peak max    :    +9dBu
        (dBFS)   :     -9dB
─────────────────────────
ANALOG LEVELS    :
In level 0dBFS   :   +18dBu
Trim Input       :      0dB
Trim Output      :      0dB
Out Fine L       :    0.0dB
Out Fine R       :    0.0dB
```

| Analog In | | IN | I1 | I2 | I3 | EXP | OM | LIM | I4 | OUT | | Analog Out |
| Digital In | | | | | | | | | | | | Digital Out |

```
DIGITAL LEVELS:
Input Gain       :      0dB
Output Gain      :      0dB
```
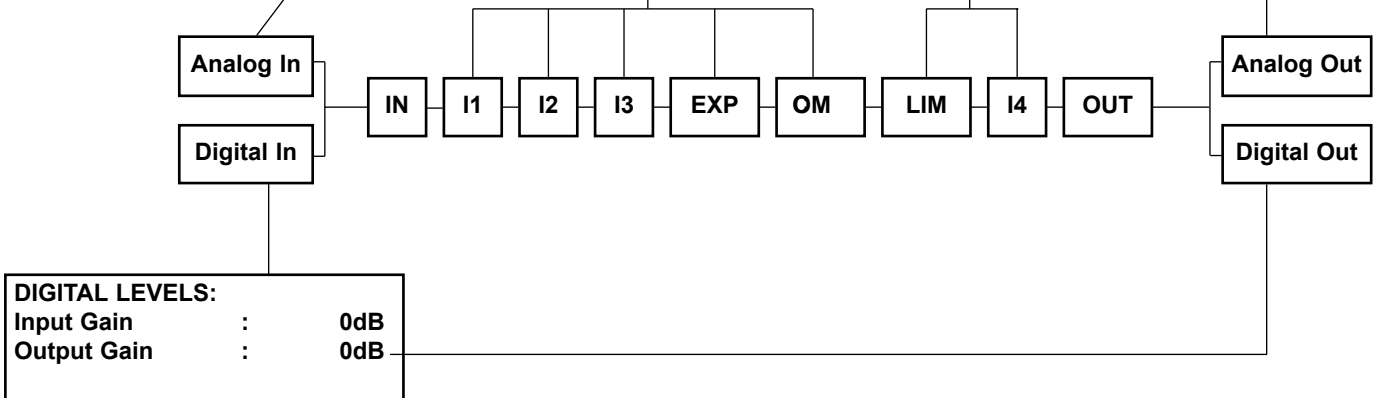
RECALL

Select which blocks to load from the new preset —

Select Preset Category —

Preset name —

Read only/On air indication —

```
Recall                    ROM RAM CARD
RECALL      ALL INS1-3 XP·COM·LM I4
CATEGORY    ALL PRODUCTION ON-AIR
EBU Limiter                      1
           READ ONLY ◆
```

— Bank indication

— Preset number

Press the RECALL key to enter the Recall page.

To recall/activate a preset:
- Use the ADJUST wheel to scroll through the presets. Until you confirm your choice you are previewing the presets. At this stage the OK LED will be blinking.
- When you find the desired preset press OK to recall/confirm.

Recall conditions
It is possible to set up a couple of conditions for the preset that you are about to recall. Use the MENU keys to step through the filters.

Recall
This function enables you to make a partial recall where you recall segments from a new preset and implement them in the currently recalled preset.
- Use the MENU keys to place the cursor at the Recall line.
- Use the ADJUST wheel to select which parts from the new preset you wish to implement in the current recalled preset.

Your Recall options are:

All	-	To recall an entire new preset.
INS 1-3	-	To recall all insert settings in Insert 1-3.
XP-COM-LIM	-	To recall all settings in the Expander, Compressor and Limiter
I4	-	To recall all insert settings in the post dynamics Insert 4

Category
This filter enables you to select presets by category.
Select "All" or a specific category and you will now only be previewing presets from the current category.

Factory/User Presets

Factory Presets

Your own Presets

Your own Card Presets

65 ROM PRESETS	128 RAM PRESETS	128 CARD PRESETS

The DBMAX contains two different preset banks and a card bank if you use a PCMCIA card.

The RAM bank can hold up to 128 presets.

The RAM preset bank is located after the ROM bank.

The card bank is located after the RAM bank.
Scroll through the ROM presets to enter the RAM bank.
Scroll through the RAM bank to access the CARD bank.

> **TIP** **For fast RAM/ROM access use the BLOCK keys to switch between the banks.**

Note: When previewing the RAM bank you will not see the empty RAM spaces.
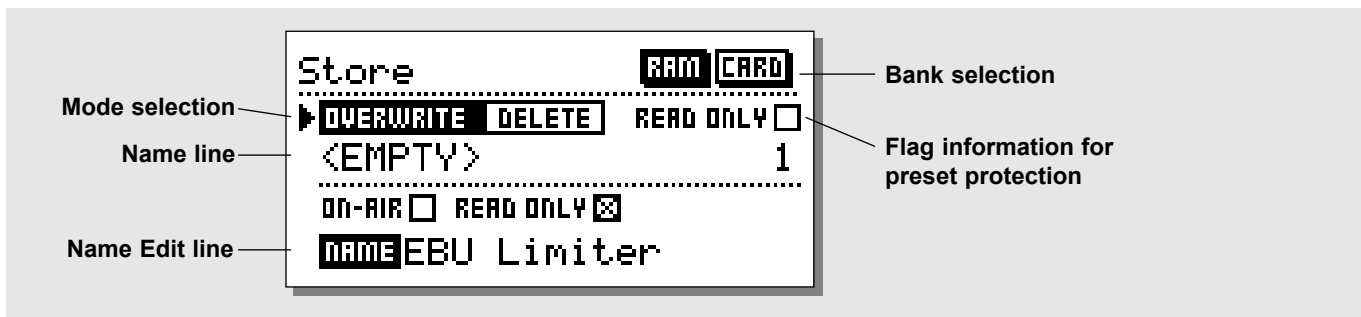
STORE - DELETE & PRESET NAMES

Store

Storing a preset with the same name
- Press the STORE key.
- Place the cursor next to the "Name" line (see illustration).
- Select a location for your new preset using the ADJUST wheel (You can store your preset in the RAM bank or the Card bank).
- Press OK and the preset is stored with the same name at the selected location.

Storing a preset with a new name
- Press STORE and place the cursor at the "Name Edit" line using the MENU keys.
- Type the new preset name. Use the PARAMETER keys to select letter position and the ADJUST wheel to select letter.
- Press OK and the preset is stored with the new name at the selected location.

Mode selection
Name line
Name Edit line

Bank selection
Flag information for preset protection

```
Store                    RAM CARD
▶ OVERWRITE  DELETE      READ ONLY ☐
  <EMPTY>                          1
  ON-AIR ☐ READ ONLY ☒
  NAME EBU Limiter
```

Flags

When storing a preset, you may give it two flags:
ON-AIR   :Use the ON-AIR flag for easy identification and sorting of presets.
READ ONLY   :Important presets may be marked with the READ ONLY for protection. A preset with this flag cannot be overwritten by another preset. A pop-up display will tell you that the preset is write protected.

Note: The READ ONLY flags may be disregarded if you wish to replace the entire RAM bank from the Utility page.

Deleting a Preset

To delete a preset in the internal RAM bank or PMCIA card:
- Press STORE.
- Use the MENU keys to move to the top line, and use the ADJUST wheel to select DELETE.
- Use the MENU keys to move down one line, and choose the preset you wish to delete by using the ADJUST wheel.
- Press OK.

Overwriting or Deleting Protected Presets
- Press STORE.
- In the top line use the PARAMETER keys and the ADJUST wheel to remove the READ ONLY flag.
- Make selections regarding Overwrite, Delete, Location, new Flags and Title as described above.
- Press OK to store or delete.

Using a Memory Card
If you wish to use a memory card, simply insert the card in the DBMAX. The DBMAX will now autodetect your card and the Store and Recall facilities will be attached to the memory card. If the format of the memory card is not correct, the DBMAX will detect this immediately.

Card types
Type 1 PCMCIA cards with a minimum of 64KB SRAM and a maximum of 2 MB.

STORE

What is stored where ?

Global Parameters

Global parameters describe your general working environment: Inputs used, System delay, Settings for Transmission or Production etc. Global parameters are not affected by setup or preset recalls. The parameters include:

- Input and Output Blocks on the Main Page:
  Delay, Formats, HP and LP Filters, Rate Conversion, Dither and Output Fader.
- Parameters in the Utility Page:
  Display Angle, RS485, Security, General Purpose Input.
- Parameters in the Tools digital Out Page.
- User Data, Name and Phone and Keyboard lock.

Setup Parameters

Setup parameters describe the interface and Reference Levels in your environment. Setup parameters are not affected by preset recalls.

If you need to deliver the same program to different Output level conditions, you may keep your preset and load a different setup. Preset parameters may change with every preset and when the Wizard is invoked.

MAIN PAGE *Input*

INPUT	I 1	I 2	I 3	EXPANDER	OMPRESSOR	LIMITER	I 4	OUTPUT
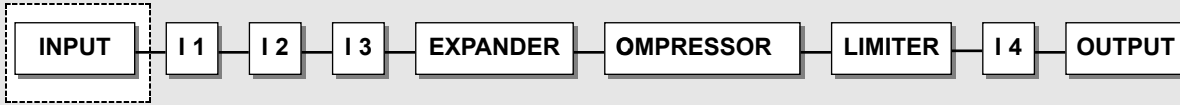
Input page 1

Black box indicates selected block

Page select

Input type selector

Master Input Delay in frames pr. second

Delay on/off switch

Sample Rate converter on/off

Clock select

Master Input delay in milliseconds

Input page 2

Lo Cut adjust

Hi Cut adjust

Reference level selection
Choose whether the setup should follow preset changes or not.

Process both channels (normal) or only Left or Right

18

Basic operation
- Select the In section on the Main page by pressing the BLOCK keys.
- Press the PARAMETER keys to move the cursor.
- Use the ADJUST wheel to change values.
- Use the MENU keys to switch between In page 1 and In page 2.

The In block settings are Global parameters.
Global Parameters are not affected by preset or setup changes.

Analog I/O levels are scaled in the analog domain and controlled from the Ref. Levels page using the analog levels In Level parameter. This is where you establish a basic relationship on both Outputs and Inputs between analog level and digital full scale. Also Inputs and Outputs may be offset individually on this page. The settings are part of the Setup parameters.

Input page 1

Input
Select Input type.
Options are Analog, AES/EBU or S/PDIF

When a digital Input is used, the transmitting device and the DBMAX need to run at the same Clock Rate, or Sample Rate Conversion (SRC) has to be used.
If the SRC is off, you have to put either the DBMAX in External Clock mode, or the transmitting device has to get a clock from the same source as the DBMAX.
To test the digital connection, try listening for a minute or so to a sine tone at say -18dBFS generated by the transmitting device.
If you hear no distortion or glitches, you've probably got it right.

Sample Rate Conversion
Sample Rate Conversion may be applied to the AES/EBU or S/PDIF Input. The Input Sample Rate may be asynchronous.
The Output of the Sample Rate converter is locked to the system Clock source.
Internal references at 44.1 or 48kHz or an external Word Clock signal may be used to drive the Sample Rate Converter and thus the rest of the system. Even though the Sample Rate Converter of the DBMAX has a wide dynamic range and low distortion (-106dBFS), synchronous data transfers are complete and should be used if possible.

It is not possible to loop through Channel Status or User Bits on the AES/EBU interface, when the SRC is inactive.

Clock - Output Sample Rate
Select Master Clock:
44.1kHz/48kHz/DI/Sync
(44.1 and 48kHz are internally generated).
The Output Sample Rate (= system rate) of the DBMAX is always set in the Clock box of the In page no 1.
Normally 48kHz is used for production in PAL and SECAM countries. 32 or 48kHz are normally used for transmission.
44.1kHz is used for regular audio CDs.

Sample Rate LED's
When a digital Input is used, and the signal is recognized, one of the three yellow RATE LEDs light up. If no signal is present, and you've selected a digital Input or Insert, all three LED's will blink.
Note: Blinking LEDs indicate a lock error condition.
The Outputs of the DBMAX will be muted and the digital audio Inputs and the BNC wordclock Input may be used as a synchronization source for the analog Inputs (AES 11).
When using Ext. wordclock, from the BNC connector, select Sync.

Note: When changing the Input to digital, the Sample Rate parameter automatically defaults to DI.

Delay - Master Input Delay
This Delay parameter enables you to delay the entire signal through the DBMAX. The delay can be set in various Frame Rates or in milliseconds.
The Delay through the unit is made up by
(values given @ 48kHz sampling):

- AD Converter Delay 0.8ms
- DA Converter Delay 0.57ms
- Processing Delay 0.54ms
- Look Ahead Delay typical 2-3ms
- User additional Delay 0-400ms

On the Input Page, the delay value is shown in total, but excluding the delay from the AD and DA converters.

To obtain the best sound quality through the multi-band compression stage a delay value between 1 and 10ms is preferable.
A typical value for transmission would be 2-3ms.
A typical value for production would be 2-10ms.
If you add additional delay (e.g. link compensation), maximum Look-ahead delay is automatically given.

Look-ahead delay is automatically compensated by the Compressor Attack settings in order prevent "holes" in the sound being generated.

Maximum delay: 400ms/10 frames

Note: The Delay setting is NOT recalled with a preset, but the Attack compensation is.

Input page 2

Low Cut

The Lo-Cut filter is global, and is used to filter out any sub-bass frequency or DC contents in the signal.
For FM processing Lo-Cut should be set between 20 and 40Hz.

Hi-Cut

The Hi-Cut filter is global and is used to remove high-end frequencies. This function is relevant if the processed signal should be used in e.g. FM, AM or WWW-Audio. Since these formats do not transmit frequencies above approx. 16kHz, high frequency peaks would unnecessarily invoke the Compressor/ Limiter unless the Hi-Cut function is not used.
Hi-Cut filters are high order and provides additional Pilot tone notching at 19kHz.

TIP **If very "hot" digital Inputs are used for FM transmission, we recommend trimming the digital Input level down by 1dB on the Ref. Levels page in order to prevent overloading the Input filters. Please see page 12 for explanations on Ref. Levels.**

Reference Level
It is possible to keep the Reference Levels settings as default settings or let these settings follow the presets:
"NO CHG" - Use this setting to keep the selected Ref. Level setting independent of preset changes.

Ref. Level
setting 1-19 - Use this setting to store a Ref. Level setting with the preset. By letting a group of presets refer to a single Reference Level setup, you are able to adjust/control the Reference Levels setup attached to an entire category of different presets.

Process
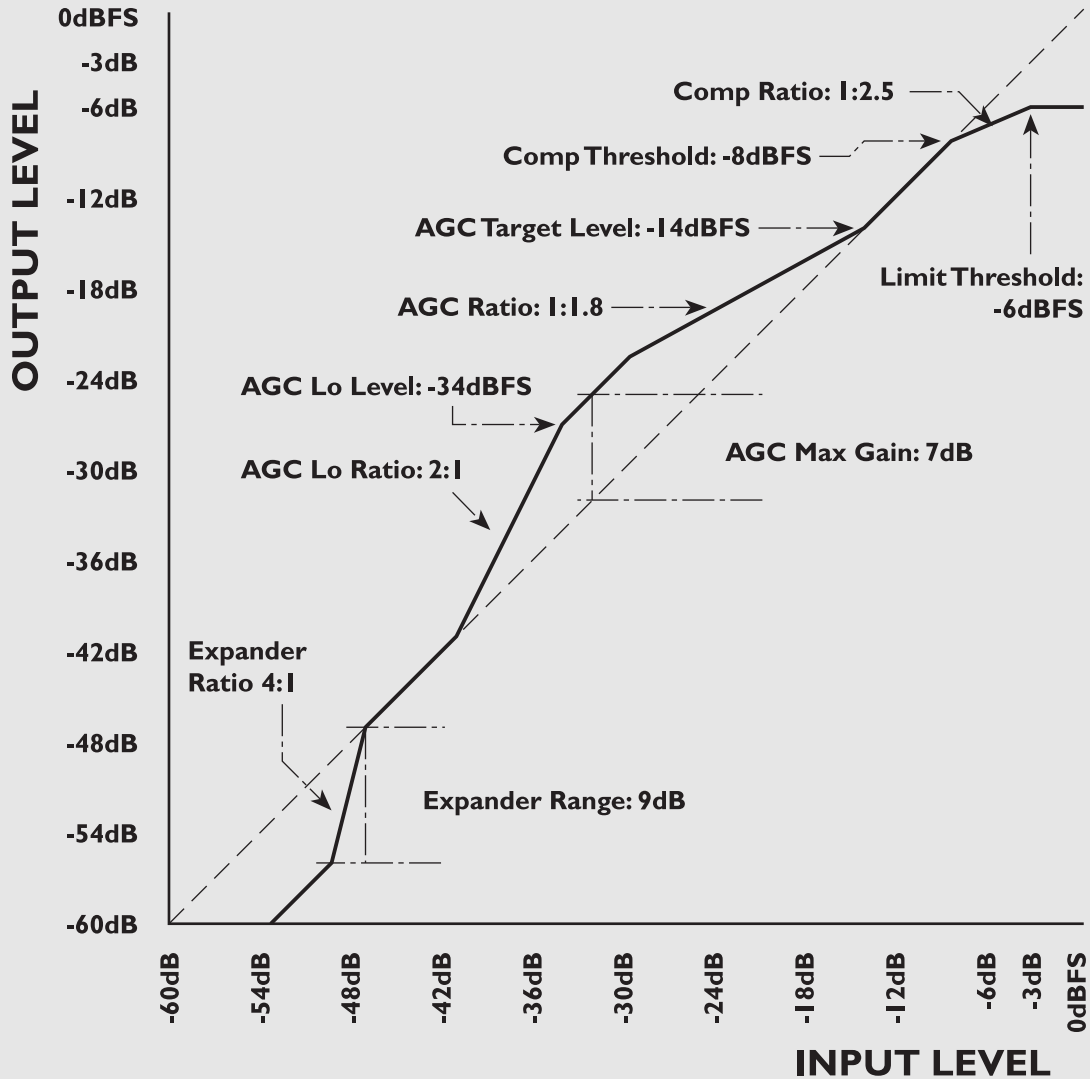Normal   : Both channels will be processed
Left only   : Only the left channel will be processed
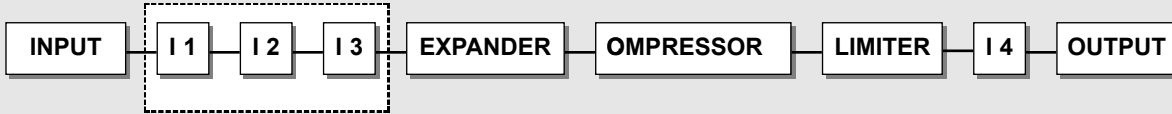Right only : Only the right channel will be processed.

On the following pages the different Insert options are explained. Please use this illustration for overview of the level handling in accordance to various parameters in the DBMAX .

INPUT — I 1 — I 2 — I 3 — EXPANDER — OMPRESSOR — LIMITER — I 4 — OUTPUT

AGC
Automatic Gain Control.

IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1
AGC — GAIN — -20 -10 0 10 20 dB — MIN MAX

LEVEL
LO TARGET   RATIO   HOLD   RELEASE
-13   2   1:4   0.35   1.0dB/S

Min/Max Gain
Maximum/minimum gain limit you allow the AGC to perform on your signal.

Low Level Target
Low level limit for the AGC.

Target
Target level for the AGC.

Ratio

Hold

Release:
AGC Release rate in dB/sec.

Parametric Equalizer

IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1   dB   L   1   2   3   4
PAR.EQ.   12-
         6-
GAIN   0-
         6-
         12-
0.0dB   70.79HZ   0.0dB   ⌐   6

Gain
Manual Make-up gain or EQ match.

Frame indicates selected band

Frequency

Band Level

Curve Type

90° MONO

IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1   90° MONO
MONO

L
R   90° MONO
-3dB

Inserts

Select Insert 1, 2 or 3 by pressing the BLOCK keys

Basic operation
- Use the MENU keys to highlight the field just below the Insert-line.
- Use the ADJUST wheel to select the insert type.
- Press the PARAMETER keys to select parameter.
- Turn the ADJUST wheel to change values.

The DBMAX has various Insert possibilities:
AGC, Parametric Equalizer, 90º deg. Mono, Dynamic Equalizer, Stereo Enhance, Normalizer, MS Encoding, MS Decoding.

Note: You can not use the same Insert type in two different Insert blocks at the same time.

AGC - Automatic Gain Control

The AGC is really a very slow compressor, used to guarantee that the signal is kept within a certain dynamic range and it is an excellent tool to compensate for the different output levels on your program material.
Unlike a regular compressor, the AGC will smoothly adjust the Output level over a relatively long period of time (approx 1 sec.), giving you a constant average level. An Attack time this long could introduce problems with transients. This problem is dealt with in a built-in selfprotective function which enables transients to invoke a fast response time (only 8 samples). The Attack time can therefore be perceived as adaptive and flexible.

Max and Min Gain
This is the Max/Min changes in gain you allow the AGC to perform on your signal, and these parameters are to be considered as the master parameters of the AGC.
E.g. when Max. gain is set to 6dB, only 6dB gain can be performed regardless of a higher Target value.
If Min. level is set to -6dB this is the Max. attenuation the AGC can perform.
If both Min. and Max. are set to 0, no gain correction will be applied by the AGC.

Low level
If the signal is below the Low Level value, the AGC will add no gain. This is a function to prevent the AGC from boosting background noise.

Target
This is the Target value in dB related to the Ref. Levels setting.
Example:
- The Ref. level is set to e.g. -12dBFS,
- The Target level is set to 2
- The Max. gain is set to 2dB or higher
The AGC will gain the signal to -10dBFS.

Ratio
Sets the Ratio for the AGC function.

Hold
Sets the Hold time for the AGC.
Within the set Hold time the AGC can keep the signal at constant level, even if the level of the Input signal briefly drops radically.

Release
Release Rate in dB/sec. Up to 9.9dB/s is allowed.

Parametric EQ

Basic operation
- Press PARAMETER keys to select: Frequency/Gain/Bandwidth/Slope.
- Turn ADJUST wheel to change values.
- Press BAND keys to jump between the five bands.

EQ Ranges

Filter Types	Frequency	Bandwidth/Slope
Low Shelving filter	19.95Hz to 5.01kHz	3, 6, 9, 12dB/Oct
Bell-shaped filter 1	19.95Hz to 20kHz	0.1Oct to 4.0Oct
Bell-shaped filter 2	19.95Hz to 20kHz	0.1Oct to 4.0Oct
Bell-shaped filter 3	19.95Hz to 20kHz	0.1Oct to 4.0Oct
High Shelving filter	501.2Hz to 20kHz	3, 6, 9, 12 dB/Oct

Gain-range for all filters is +/- 12dB

Gain-range for the Gain is +/- 12dB

90° Mono

This function makes it possible for surround signals to be compatible with mono signals. The slight phase change enables you to reproduce signals that otherwise would have disappeared in a mono situation.
May be used for monitoring or for actual live processing.
The Output of the 90º mono circuit is mono, L=R.
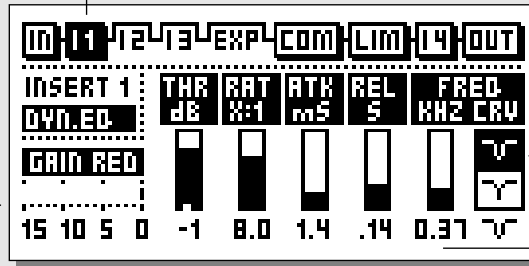*Note! The 90º mono block has no adjustable parameters.*

INPUT — I 1 — I 2 — I 3 — EXPANDER — OMPRESSOR — LIMITER — I 4 — OUTPUT
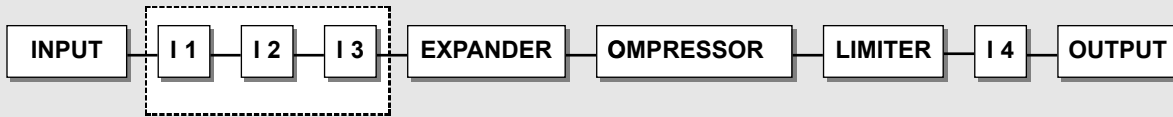
Black box indicates selected block

Dynamic Equalizer

IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1
DYN.EQ.

GAIN RED

CURVE
Sets the frequency characteristics of the dynamic damping filter.

THR dB	RAT X:1	ATK mS	REL S	FREQ. KHZ CRV

Gain reduction
Indicates the actual gain reduction performed by the Dynamic EQ.

15 10 5 0 -1 8.0 1.4 .14 0.37

Frequency
Sets the working frequency of the Dyn-EQ.

Threshold, Ratio, Attack, Release

Stereo Enhancer

IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1
ST-ENH

ADD.
WIDTH

MAX ADD. WIDTH	XO FREQ.	LO FREQ.

Low frequency adjust

Added width
The actual added width.

15% 40HZ 0
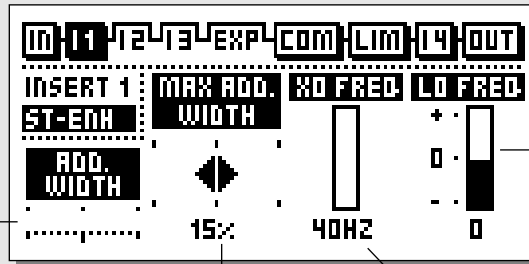
Max added width
Adjusts the added width to the stereo perspective.

Cross-over frequency

IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1
ST-IMG

SPECTRAL
STEREO
IMAGE

0 15 25

MAX
NORM
MIN

Image Width In %

100 1.00K HZ

Cross-over frequency

Dyn EQ

Threshold
When the Input level exceeds the Threshold, the Dynamic Equalizer will be activated.

Ratio
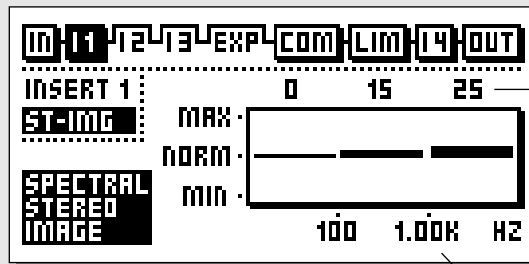The Ratio of the gain reduction. When the Ratio is set to 4:1 it means that for every 4dB the defined frequency range rises above Threshold, the Output level of the specified frequency is increased by only 1dB.

Attack
The Attack time is the response time that the Dynamic EQ uses to reach the gain reduction specified by the Ratio parameter.

Example: If the Input signal increases to 4dB above Threshold with the Ratio set to 4:1 and the Attack set to 20ms, the Dynamic EQ will use 20ms to reach the gain reduction of 3dB.

Release
Release sets the fall-back time of the Dynamic EQ, after the signal drops below the Threshold.

Curve
Sets the bandwidth or low/high shelf setting of the range the Dynamic EQ should work in.

Stereo Enhance

With Stereo Enhance, you can enhance the stereo information of the signal. This function is especially useful when you are processing material with only a small amount of stereo perspective. By enhancing the stereo feeling of a signal with an excessive amount of mono information, listening fatigue can be prevented.
Please note that a Stereo Enhancer can not create stereo information, but only enhance exsisting stereo information.

Max added Width
With this parameter you set a limit for the Width you will allow to be added to the signal.

Added Width
Graphical illustration of the actual added width.
The actual possible added width depends on the stereo content of the signal. If the source material is 100% mono no stereo information can be added/enhanced.
Adding stereo perspective to the low frequency area will generally result in a less punchy and direct bass.
We have therefore included the Low Freq parameter with the following settings:

Lo Freq. 0 : No change.
Lo Freq. - : Collapse image at low frequencies.
Lo Freq. + : Add width at low frequencies.

Spectral Stereo Image
This function allows you to control the stereo width of your signal in three independent bands by adding or subtracting stereo information. Selecting values above 0 (Normal) will enhance the stereo information in the selected band, while values below 0 will reduce stereo information.
Use the PARAMETER keys to select the desired parameter and dial the ADJUST wheel to change values.
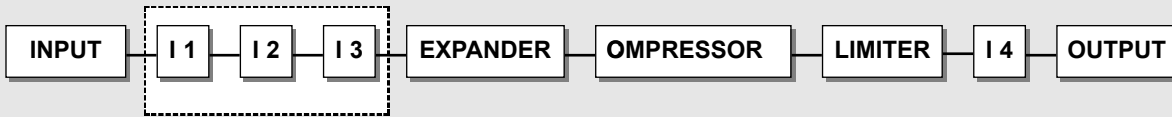
Cross-Over Frequencies
The minimum bandwidth for the Mid-band frequency area can be 1 octave.
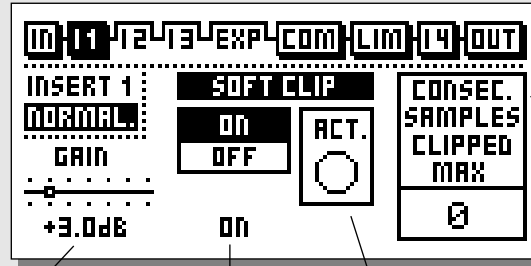
> **TIP** **Try enhancing the Stereo Image in the Mid and High band, while leaving the Low band untouched. This will widen the vocal and cymbal area while maintaining the punch from the bassdrum.**

| INPUT | I 1 | I 2 | I 3 | EXPANDER | OMPRESSOR | LIMITER | I 4 | OUTPUT |

Normalizer

```
IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1      SOFT CLIP       CONSEC.
NORMAL.          ON           SAMPLES
 GAIN           OFF     ACT.  CLIPPED
                               MAX
 +3.0dB          ON              0
```

Consecutive samples clipped.
Counts the number of clipped samples within a 1 sec. time period.

Normalizer Gain

On/off switch

Active
Will blink when active.

MS Decoding

```
IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1      BALANCE        MS
MS-DEC                     DECODE
M      M     M   C   S      ON
S      S                    OFF
BAL DECODE      CENTER      OFF
```

MS-Decode on/off switch.

Mid-Side balance control

MS Encoding

```
IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 1       MS         FINE
MS-ENC       ENCODE      BALANCE
L      L      ON       L   C   R
R      R      OFF
ENCODE BAL    OFF        CENTER
```
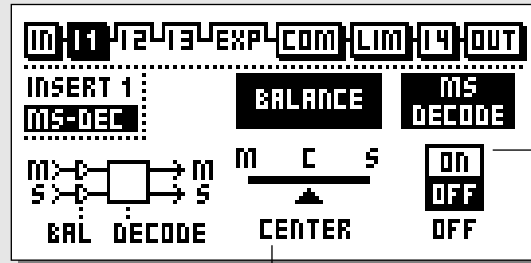
Fine balance adjust
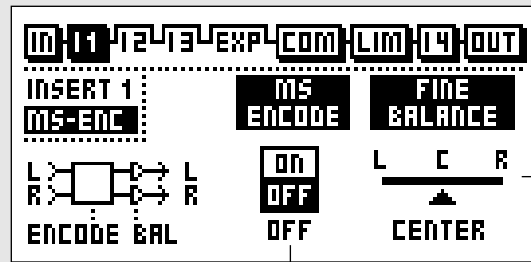
MS Encode on/off switch

Normalizer

Optimization of the level of your material begins in the Normalizer. The objective here is to increase the gain to a level just below clipping. However, if the clips only occur occasionally, and only few samples are clipped per test interval, you do not necessarily have to reduce the gain of the Normalizer. The Normalizer monitors the signal within 1 second time periods.

Gain

The Normalizer is capable of gaining +18 dB.
By increasing the Gain parameter the level of the signal gets closer to 0dBFS, and gaining the Input signal can therefore be perceived as a decreasement of the headroom.

On/off

On/off switching for the Softclipper.

Act. - Active

Will indicate (diode-style) when the Softclipper is activated.

Consecutive Samples Clipped

The Clip Counter indicates the maximum number of consecutive samples clipped within the last second.

MS Decoding/Encoding

MS (Mid/Side) miking technique uses a forward-facing directional mic and a side-facing bi-directional mic.
MS recording offers very good stereo imaging with the added benefit of excellent mono compatibility. Through the electronic process of MS Encoding and Decoding, the two mic signals can be combined to create a stereo signal either before recording or on playback.

MS Decoding

MS Decoding will change a Mid/Side signal into a left/right signal.

Mid/Side Balance Control

The Balance control will allow you to change the relationship between the Mid/Side signals.

MS Decode on/off

On/off switch for the MS Decode Insert.

When MS-Decode is set to off the Fine balance parameter can be used for fine-tuning the left/right level balance.

MS Encoding

MS Encoding will change a regular left/right signal into a Mid/Side signal.

Fine Balance

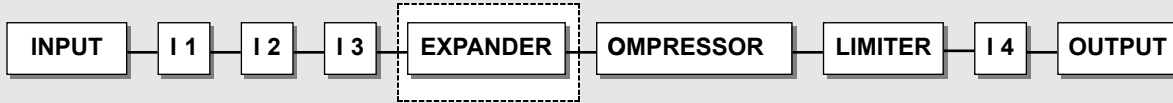The Fine Balance control will allow you to adjust the relationship between the Mid/Side signals.

MS Encode on/off

On/off switch for the MS Encode Insert.

**TIP** **Try lowering the Mid signal by a few dB. This is what is perceived as an enhancement of the overall Stereo image.**

MAIN PAGE *Expander*

INPUT — I 1 — I 2 — I 3 — **EXPANDER** — OMPRESSOR — LIMITER — I 4 — OUTPUT

PAGE 1

Expander page select

Selected band indication
A dot indicates selected band or bands. By default all bands are selected, but you can adjust each band individually.

Gain Reduction
Shows the actual gain reduction on each of the 5 individual bands.
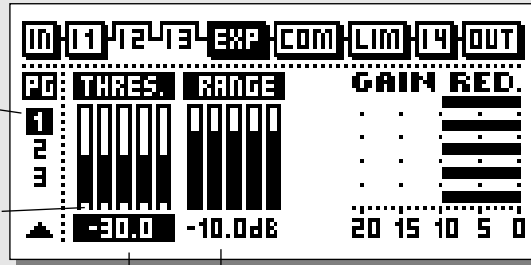
Threshold

Range
Adjusts the gain reduction of the 5 bands.

PAGE 2

The Edit guide
Arrow direction indicates whether the selected parameter value has been increased or decreased since last Recall. A dot indicates no changes.
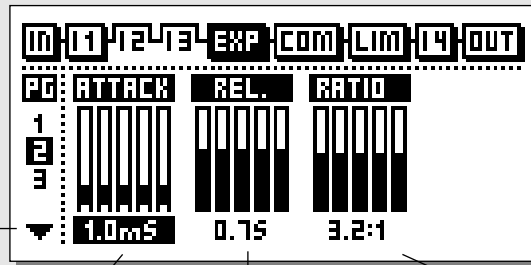
Attack time
Individual adjustment of Attack time on the five bands.

Release time
Individual adjustment of Release time on the five bands.

Ratio
Individual adjustment of Ratio on the five bands.

PAGE 3

CROSS-OVER FREQUENCY PAGE
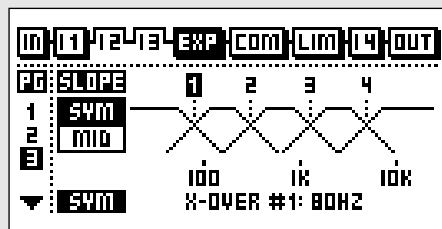
Expander

Expander Bypass
Press the gray BLOCK on/off key to bypass the Expander block.

Select EXP by pressing the BLOCK keys
Expander/Gates are often used to remove unwanted background noise. Both the Gate and the Expander perform what is called "Downward Expansion". In general this means that below a certain Threshold the Input signal gain is reduced on the Output according to a specific Ratio. If for instance the Expander has a Ratio of 1:2, the Output is decreased with 2dB for every single dB the Input is decreased below Threshold.
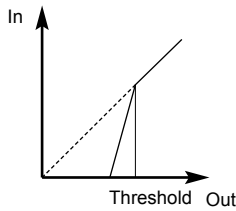
Basic Operation
- Press the PARAMETER keys to select parameter.
- Turn the ADJUST wheel to change values.
- Press the BAND keys to select between the five bands.
- Press the MENU keys to select Page1-3.

Page 1

Threshold
The Thresholds refer to "Ref. Level" in the Ref. Level menu. Individual bands can be selected by pressing the BAND keys.

Range
The Expander Range determines the maximum amount of gain reduction in each of the five bands in the Expander. E.g. when set to 6dB, the Expander will only reduce the Output by 6dB no matter how much the signal drops below Threshold. This enables you to use the Expander to simply reduce the signal below a certain Threshold instead of a complete shut-off.

Gain Reduction - Monitor
Graphical indication of the performed gain reduction in each of the five bands.

Page 2

Press Menu keys to select page 2

Attack
Attack is the time the Expander uses to bring the reduced signal to 1:1 when the signal exceeds the Threshold.

Release
The Release time is the time the Expander uses to reach the gain reduction specified by the Ratio parameter.

Ratio
The Ratio of the gain reduction. Use these parameters to adjust the Ratios of the five Expander bands. If the Ratio is set to 4:1 you will get a 4dB decrease on the Output signal for every 1dB the Input signal is decreased below Threshold.

Example: If the Input signal drops 4dB below Threshold, with the Ratio set to 1:4 and the Release time set to 20 ms, the DBMAX will use 20ms to reach a total gain reduction of 16dB.

Page 3 - Cross-over Menu
Press MENU keys to enter Page 3.

This page is common for the Compressor, Expander and Limiter. Please see the description on page 33.

The Edit Guide
The symbol in the lower left corner of the display is an Edit guide. This indicator will help you get back to the parameter values of the latest Recalled preset.

Example:
If you have been working on various parameters within a preset and would like to get, lets say, the original Ratios back without changing the Attack/Release times, simply select the Ratio parameters one by one and follow the Edit guide.

MAIN PAGE *Compressor*
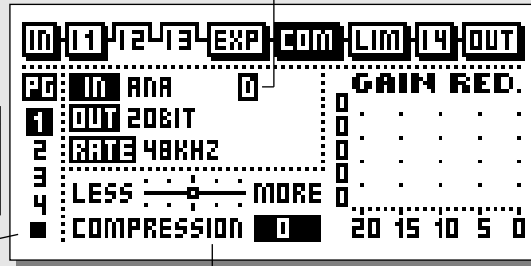
INPUT — I 1 — I 2 — I 3 — EXPANDER — OMPRESSOR — LIMITER — I 4 — OUTPUT

Flag indication

PAGE 1

Page select

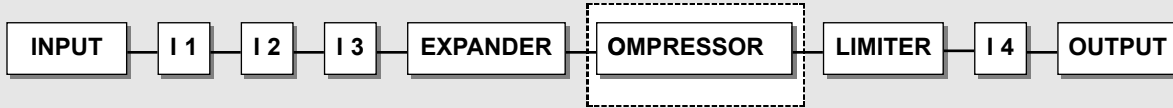**Gain Reduction**
Shows the actual gain reduction on each of the 5 individual bands.

```
PG  IN  ANA       0        GAIN RED.
 1  OUT 20BIT               0
 2  RATE 48KHZ              0
 3                         0
 4  LESS  —□—  MORE        0
 ■  COMPRESSION  0    20 15 10 5 0
```

The Edit guide
Arrow direction indicates whether the parameter value has been increased or decreased since last Recall. A dot indicates no changes.

Less/More
Adjusts the intensity of the compression.

PAGE 2

```
IN I1 I2 I3 EXP COM LIM I4 OUT
PG  THRES.  RATIO  BAND LEVEL  OUT
 1                              +
 2                              0
 3                              -
 4
    0.5     4.0:1      0.0     0.0
```
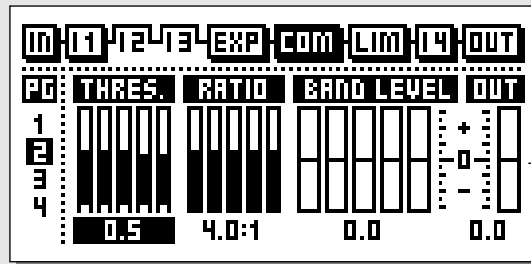
Out Level

Threshold
Individual control of Threshold of the five bands.

Ratio
Individual Ratio control for the five bands.

Band Level
Individual band level control for the five bands.

30

The Compressor
Select COM by pressing the BLOCK keys

Basic operation
- Press the PARAMETER keys to select parameter.
- Turn the ADJUST wheel to change values.
- Press the BAND keys to select between the five bands.
- Press the MENU keys to select between the 4
  Compressor pages.

About the Compressor
The Compressor section of the DBMAX is divided into five bands. This means that you are able to compress five different frequency areas separately.
Based on a number of requests from initial users of the DBMAX, the automatic Make-Up gain has been removed, even though it partly still exists when using the Less/More handle.
Normally you should use the overall gain labeled OUT on Page 2 for Make-Up, and by having full control over the individual band levels there is now a very efficient way of adding post dynamics Equalization to your signal.
Dynamic Equalization can also be achieved simultaneously by using different Threshold and Ratio values in the different bands.

If you want to off-set the spectral balance (EQ) of low level signals, use the Band Levels in page no. 2 of the Compressor block.
If you want to off-set the spectral balance of high level signals, use the Threshold and Ratio in page no. 2 of the Compressor block.

Page 1
Less/More - Compression
An overall compressor intensity parameter. By using this function you can increase or decrease the intensity of compression while keeping the relationship between the Threshold and Band level parameters in accordance to the specified Ratio settings.
Threshold, Ratio and Band level parameters are found in page 2.

Flag indication
Different letters (flags) will occur on the In and Out line in the Compressor.

D - Delay time. (1-400ms) A "D" indicates that a Delay time has been added in the In block page 1 for the digital Inputs/ Outputs. The first 10ms. works as a look ahead-delay to increase the precision of processing.
Note! Please refer to page 19 for additional info on delay thru the unit.

E - An "E" on the In-line indicates that Emphasis is present on the Input signal. The DBMAX automatically removes Emphasis present from the Input signal.

F - Input Hi-Cut/Lo-Cut filters active.
These filters are described on page 20.

S - Sample Rate converters on.

Gain Reduction
Graphical indication of the actual gain reduction performed by the Compressor.

Page 2
Press MENU keys to enter page 2

Threshold
Use the ADJUST wheel to change the Thresholds of the five bands.
The Thresholds refer to "Ref. Level" in the Ref. Level menu.

Ratio
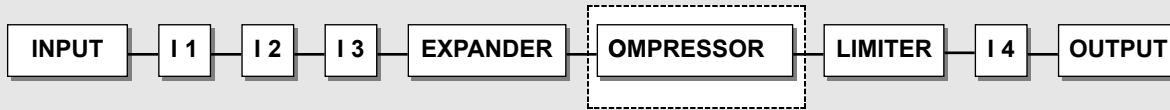Use these parameters to adjust the Ratios of the gain reduction in the five Compressor bands.

Band Level
The five band levels are used to adjust the spectral balance of the Compressor. Below the five bands, the level of the Mid band is displayed.

Out Level
With this parameter you can adjust the overall Output of the Compressor. This is the parameter you would use as make-up gain.
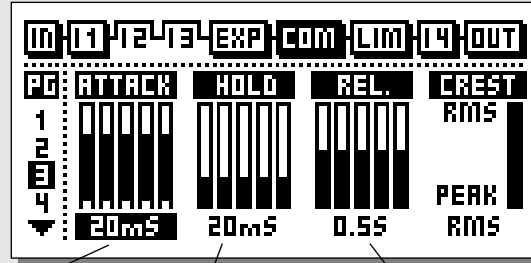
MAIN PAGE *Compressor*

INPUT — I 1 — I 2 — I 3 — EXPANDER — OMPRESSOR — LIMITER — I 4 — OUTPUT

PAGE 3

```
IN I1 I2 I3 EXP COM LIM I4 OUT
PG  ATTACK   HOLD    REL.   CREST
1                              RMS
2
3
4
    20mS    20mS    0.5S    PEAK
                            RMS
```

Crest
This parameter determines whether the Compressor should react to peaks, RMS (average) or something in between.

Attack
Individual Attack times for each of the five bands.

Hold
From 10-200ms.

Release
Individual Release times for each of the five bands.

PAGE 4

```
IN I1 I2 I3 EXP COM LIM I4 OUT
PG  SLOPE   1    2    3    4
1   SYM
2   MID
3
4
    SYM    100   1K   10K
           X-OVER #1: 80HZ
```
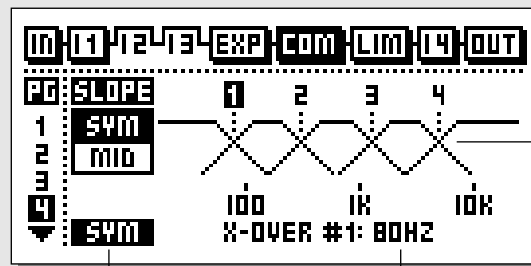
Cross-over point

Slope type

Cross-over frequency

Page 3

Press MENU keys to enter page 3.

Attack
The Attack time is the time the Compressor uses to reach the gain reduction speciefied by the Ratio parameter set in page 2. Use the ADJUST wheel to change the Attack time of the five bands.

Hold
After the signal has dropped below Threshold, the Hold parameter can be used to sustain the signal before it is released. The range is 10-200ms

Release
Release sets the fall-back time of the Compressor, after the signal drops below the Threshold.

Crest
This parameter determines whether the compressor should react to peaks, RMS (average), or something in between. For example if the Crest parameter is set at 6dB, the Compressor is reacting to RMS values and to peaks 6dB higher than the current RMS value.

Page 4 - Cross-over Menu

Press MENU keys to enter the Cross-over frequency page (Xovr)

Cross-over point 1-4
Cross-over frequencies may be altered on the last page of the Expander, Compressor and Limiter, but they are identical in all three blocks.
Two different filter structures are available:
- SYM with soft slopes
- MID with higher order middle band focused filter slopes.
The MID setting is designed specifically for low intermodulation between the bands, but if you want to emulate the TC Finalizer, you should use a 3-band structure and a SYM slope setting.

Number of Bands
On the Cross-over page, outer bands may be turned off by turning the cross-over points all the way up or down.
When a structure of less than 5 bands is used, the bands are also removed from the graphic display.

Slope Types
Two different filter structures are available. SYM with soft slopes and MID with higher order middle band focused filter slopes.

Cross-over frequency
Sets the Cross-over frequency for the selected Cross-over point.

Cross-over point
With Cross-over points 1-4 you set the Cross-over points between the five bands in the dynamics section.

Note: The Cross-over points are common for the Compressor, Limiter and Expander.

Compressor Bypass
Press the gray BLOCK on/off key to bypass the Compressor section.

MAIN PAGE *Limiter*
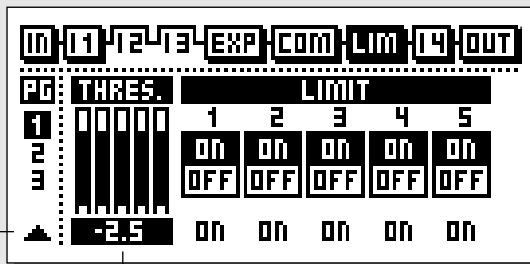
INPUT — I 1 — I 2 — I 3 — EXPANDER — OMPRESSOR — LIMITER — I 4 — OUTPUT

PAGE 1

The Edit guide
Arrow direction indicates whether the parameter value has been increased or decreased since last Recall. A dot indicates no changes.

Limiter Threshold
Separate Threshold adjustment on each of the five bands.

Limit on/off
Bypass Limiter on individual bands.

PAGE 2

Gain Reduction
Shows the actual gain reduction on each of the 5 bands.
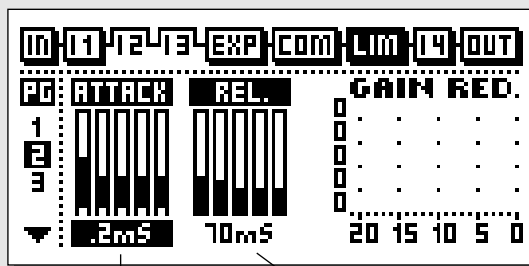
Attack Times
Individual Attack times for each of the five bands.

Release
Individual Release times for each of the five bands.

PAGE 3
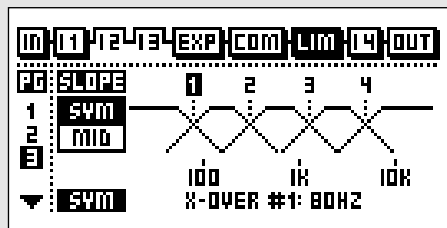
The Limiter
Select LIM by pressing the BLOCK keys

Basic operation
- Press the PARAMETER keys to select parameter.
- Turn the ADJUST wheel to change values.
- Press the BAND keys to select between the five bands.
- Press the MENU keys to select User/Xpert/Xover.

Page 1

Threshold
Use the ADJUST wheel to change the Thresholds of the five bands. The Thresholds refer to "Ref. Level" in the Ref. Level menu.

On/Off
Use these parameters to enable/disable the five Limiter bands.

Page 2
Press MENU keys to enter page2.

Attack
Use the ADJUST wheel to change the Attack time of the five bands.

Release
Use the ADJUST wheel to change the Release time of the five bands.

Page 3 - Cross-over Menu
Press MENU keys to enter the Cross-over frequency page (Xovr)

Cross-over point 1-4
Cross-over frequencies may be altered on the last page of the Expander, Compressor and Limiter, but they are identical in all three blocks.
Two different filter structures are available:
- SYM with soft slopes
- MID with higher order middle band focused filter slopes.
The MID setting is designed specifically for low intermodulation between the bands, but if you want to emulate the TC Finalizer, you should use a 3-band structure and a SYM slope setting.

Number of Bands
On the Cross-over page, outer bands may be turned off by turning the cross-over points all the way up or down.
When a structure of less than 5 bands is used, the bands are also removed from the graphic display.

Slope Types
Two different filter structures are available. SYM with soft slopes and MID with higher order middle band focused filter slopes.

Cross-over frequency
Sets the Cross-over frequency for the selected Cross-over point.
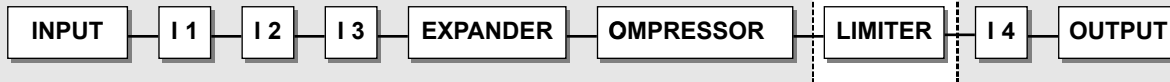
Cross-over point
With Cross-over points 1-4 you set the Cross-over points between the five bands in the dynamics section.

*Note: The Cross-over points are common for the Compressor, Limiter and Expander.*

Limiter Bypass
Press the gray BLOCK on/off key to bypass the Expander section.

MAIN PAGE *Post Dynamic Inserts*

INPUT — I 1 — I 2 — I 3 — EXPANDER — OMPRESSOR — LIMITER — I 4 — OUTPUT
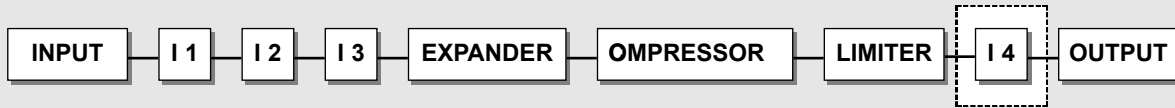
Transmission Limiter
Insert especially for Transmission or Transmission emulation.

Emphasis
First letter - Analog
Second letter - Digital
Lin/Linear - when type is set to off.

```
IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 4    HF    LIM  REL/S  S.CLIP
TX LIMIT     o     o
EMPHASIS     o
OUT TYPE→
LIN   OFF   0.0   -3.0  0.28   -3dB
```

Softclipper
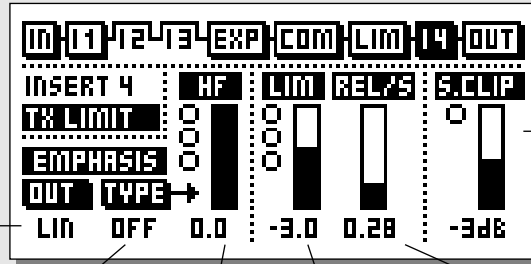
Emphasis type
50µ, 75µ or J.17

Dynamic HF Limiter

Limiter
Related to the Abs. Max peak setting.

Release time pr. second

Production Limiter
This Insert is normally used in Production and Continuity applications.

```
IN I1 I2 I3 EXP COM LIM I4 OUT

INSERT 4   LIMIT  ATK  REL/S  S.CLIP
PROD.LIM          PPM
GAIN RED          FAST
                   TX
15 10 5 0  -3.0   PPM  0.28   -3dB
```

Softclipper

Gain Reduction
Shows the actual gain reduction performed by the Production Limiter.
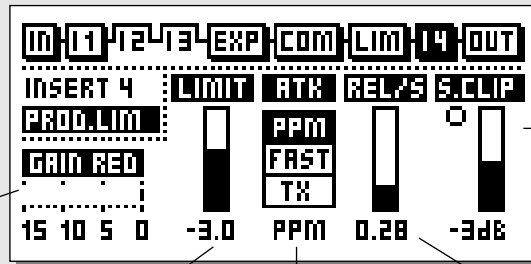
Limit

PPM Characteristics

Release time pr. second

Post Dynamics Inserts

Two different types of Limiters are available as post Dynamic Inserts in the I4 block. The dynamic Transmission Limiter and the static Production Limiter.

Transmission Limiter (TX)

Transmission Limiter with integrated Dynamic Emphasis and Soft Clip.

This Insert is normally used for Transmission or Transmission Emulation.

This Limiter is distortion cancelled and overshoot free.

- Activity of the Dynamic Limiter is shown by the on-screen "LEDs" in the HF section.
- Activity of the Soft Clipper is shown by the on-screen "LED" in the Softclip section.
- Activity of the Dynamic HF Limiter is shown by the on-screen "LEDs" in the Lim. section.

Emphasis
The DBMAX generates Emphasis of the type given at the Lim parameter (50µS, 75µS or J17).

You have different options for monitoring the Output signal regarding Emphasis.
Emphasis is handled according to this table:

Out
Linear : When type is set to "OFF", no Emphasis is applied.
E-E   : Emphasis on analog and digital Out.
E-D   : Emphasis on analog Out, De-Emphasis on digital Out.
D-E   : De-Emphasis on analog Out; Emphasis on digital Out.
D-D   : De-Emphasis on both analog and digital Outputs.

Lim
The Threshold setting of the Limiter.

Rel/s
Sets the Release time in the Transmission Limiter. This is the fallback time for the Limiter after the signal drops below the Threshold.

HF-compensation
HF compensation is given by the Dynamic HF Limiter, ensuring optimum and distortion-free transmission.

Soft Clip
Soft Clip is related to Abs. Max Peak, which is set on the Ref. Level page. Activity of the Soft Clipper is shown by the on-screen "LED".

Production Limiter

Production Limiter for use with analog DIN PPM meters or digital peak meters.

Gain Reduction
Shows the actual gain reductions performed by the Limiter.

Limit
The Threshold setting of the Limiter.

This Limiter is distortion cancelled and the Attack time may be calibrated to suit different environments:

ATK setting PPM:
Limiter characteristics to comply with analog PPM meters (DIN45406/IEC268-10, 10ms).

ATK setting FAST:
Limiter characteristics to comply with analog PPM meters with a fast response (1mS).
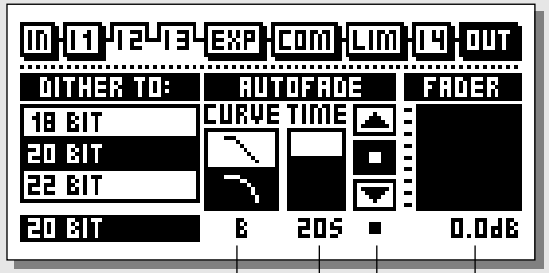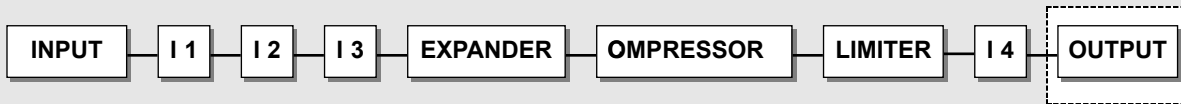
ATK setting TX:
Limiter characteristics to comply with digital meters (0mS).

Activity of the Dynamic Limiter is shown by the on-screen Gain Reduction meter.

Soft Clip
Soft Clip is related to Abs. Max Peak, which is set on the Ref. Level page. Activity of the Soft Clipper is shown by the on-screen "LED".

MAIN PAGE *Output*

FADE SECTION
CURVE *sets the fade-out curve*
TIME *sets the fade-out time*
FADE *up/down/stop*
LEVEL *set fader level manually.*

Note:
If an external fader is connected, all of the above
parameters are disabled.

Select no. of bits dithered to:
8 bit
16 bit *(default for S/PDIF)*
18 bit
20 bit
22 bit
24 bit *(default for AES)*

Select the OUT section in the Main page by pressing the BLOCK keys

Dither
The use of Dither is very important when interfacing digitally between audio equipment.

Every time resolution is changed from higher to lower, Dither (randomization) is necessary to minimize distortion for signals close to the noise floor. Even if the signal only has passed through a digital mixer, or a DBMAX, for adjustment of level, Dither should be applied if the succeeding device is of a lower resolution.
Dither in the DBMAX is only applied to the Main digital Outputs, and will not affect the analog Output signal.
Be sure to monitor the Output of the receiving device (e.g. post DAT), to hear the final result.

Dither Resolution
The Output resolution of the DBMAX is 24 bit. When the receiver of the DBMAX's signal has a lower resolution, Output Dither must be applied in the DBMAX to equal the resolution of the receiver.

Example: If the DBMAX is hooked up to a DAT via AES/EBU or S/PDIF interfacing, the Output Dither of the DBMAX should be set to 16 bit.

If the receiver is a HD editor capable of recording 24 bits, DBMAX Dither should be turned off.
If the receiver is a HD editor capable of recording 16 bits, but processing 24 bits all the way from the Input, Dither should normally be turned off at the DBMAX, leaving the dithering to be done within the HD editing system. If in doubt, try recording a low level sine wave through the DBMAX with the Dither switched off. For a 16 bit system, use a tone at e.g. -60dBFS. Play it back adding a fair amount of digital gain (e.g. 40dB), and listen for distortion. If distortion is heard, dither is not applied internally in the HD editor, and you have to do it with the DBMAX.

Note: The Dither Resolution parameter is always reset when changing the primary Output.

Dither Type
In the DBMAX, TC Electronic has chosen to use TPDF Dither. This is the most user friendly type of Dither, and it does not restrict you from further downstream processing.
You can Dither to 8, 16, 18, 20, 22 or 24 bits.

Auto Fade
The DBMAX is capable of auto-fades up to 60 seconds.

Select the Fade Curve type and the Fade time.
To start the fade, select the fade up/down parameter and turn the ADJUST wheel.

You also have the possibility of a manual fade, simply by selecting the Lev. parameter and turning the ADJUST wheel. The manual fade function can also be controlled by the optional TC Master Fader. Please see description at page 59.

Note: The Pedal Function in the Utility menu must be set to Fader for external control.

FLOW SURR PEAK PHASE DIO CALIB
INTERNAL LEVELS (REL.MAX PEAK OUT)
IN I1 I2 I3 EXP·COM·LIM I4 OUT
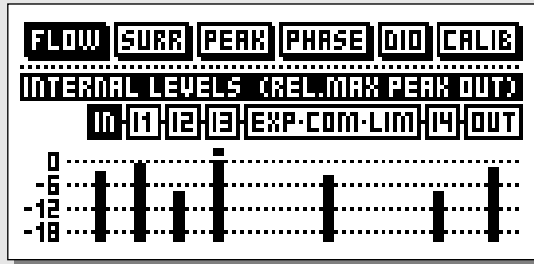
Internal levels (ppm)

Flow
In the Flow meter, you have five small peak meters, representing the level in the different sections of the DBMAX.
The Flow meter refers to absolute peak in the Ref. Levels menu.

When a block is overloading, use the parameter keys to select the current block and press OK for direct access.

FLOW SURR PEAK PHASE DIO CALIB
SURROUND METER
LEFT   L
RIGHT   R
CENTER L+R
REAR   L-R
dBFS   -30 -24 -18 -12 -9 -6 -3   0
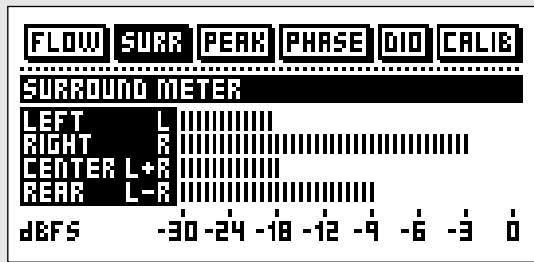
Surround meter
Four bars indicating the level of Left, Right, Left+Right, and Left-Right.

This will give you an impression of how much level you have present in a surround environment.

TOOLS *Peak-Hold Meter*

Peak

The Peak-Hold meter is an Output meter with infinite hold. It is possible to see the level of the maximum peak with 0.1dB precision.

Press OK to reset the meter.

FLOW SURR PEAK PHASE DIO CALIB

PPM/PEAK HOLD   dBFS

L ‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖ | - 0.7dB
R ‖‖‖‖‖‖‖‖ | -10.3dB

-24 -18 -12 -9 -6 -3 -1 -.5 0   PEAK

PRESS OK TO RESET

Numeric readout of peak values

TOOLS *Phase Meter (correlation)*

FLOW SURR PEAK PHASE DIO CALIB

TIME/DIV: 0.1 SEC
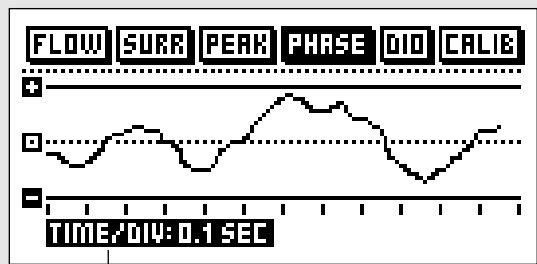
Time/division
Curve speed

Phase Meter

The Phase meter displays the phase relationship between the two stereo channels.

Plus means that the two channels are in phase.
Minus means that the two channels are out of phase.

Time/division

Sets the curve drawing speed.

TOOLS *Digital I/O - DIO*

RECEIVED STATUS BITS

FLOW	SURR	PEAK	PHASE	DIO	CALIB

PAGE **IN** OUT

RECEIVED STATUSBITS:

PRE-EMPHASIS:	OFF
SOURCE DEVICE:	DAT
AUDIO DATA:	16BIT
COPYRIGHT:	ONE COPY ONLY

Pre-emphasis indicator: On/off

Source device: DAT, CD, mixer etc

Number of audio bits received

Copyright: None, One copy only, Infinite copies

FLOW	SURR	PEAK	PHASE	DIO	CALIB

PAGE IN **OUT**

COPY ENABLE	STATUS BIT OUT
NO COPY	AES/EBU
1 COPY	SPDIF
INFIN. COPY	FROM INPUT

| INFIN. COPY | FROM INPUT |

Status bit info

Copy status

TOOLS *Calibration Tone*

FLOW	SURR	PEAK	PHASE	DIO	CALIB

CALIBRATION: PRESS OK TO START

LEVEL:

▶ | dBREF: -12dB | dBu: -0dB | dBFS: -25dB |

TONE: 1000 HZ

| 30 | 100 | 400 | 1000 | 10000 | BESSEL | 15000 |

Tone

Calibration tone
In Calibration you can choose between various test tones at definable level.

Level
Set the desired level of the test tone.

In

This display has various indicators describing the received digital signal.

Pre-emphasis
This parameter indicates whether the incoming signal is pre-emphasized or not.

Source device (Category code)
The device status of the received signal is shown in this indicator.

Audio data
The number of received audio bits is indicated here.

Copyright (Copy inhibit).
Status of the copybits.

Note: The above information can only be displayed if the information is present in the digital signal.

Out

In this display you set up how the DBMAX should output your material.

COPY ENABLE
Set the copyrights of your material:

   - No copies
   - 1 copy only
   - Infinite number of copies.

Note: The copy protection is only valid with S/PDIF signals.

Status Bit Out

AES/EBU
When AES/EBU is selected the DBMAX will transmit its own professional set of status bits, meaning that any incoming ID will be lost. However, in order to take full advantage of the DBMAX's 24 bit resolution you should select AES/EBU to make sure that the receiving device after the DBMAX will accept all 24 bits.

S/PDIF
When S/PDIF is selected, the DBMAX will transmit its own consumer status bits out, meaning that any incoming ID will be lost. The DBMAX's S/PDIF Output carries up to 24 bits. Only the S/PDIF signal contains copy protection information.

From Input
When this setting is selected the DBMAX will transmit the same information as it received. However, you still have the possibility to change the copy status.

Calibration Tone

For optimal level handling in your signal chain, correct calibration of all meters is essential.
The DBMAX can be used to generate a calibration tone.

Level
dBref. refers to Ref. Level in the Ref. Level menu.
dBu refers to the In level in the Ref. Level menu.
dBFS refers to Digital fullscale.
The test tone level can never exceed 0 dBFS.

Tone
Select the desired testtone and press OK to start.
Press OK again to stop.

```
Utility
·······································
 DISPLAY:
▶Viewing Angle: ———█——
 TIMING CALCULATIONS:
 Based On fps :      24
 RS485 CTRL:
 Prg. Change  :     Off
 Address      :       1
 SECURITY:
 Security Lock: PRESS OK
 Your PIN-CODE:       0
 MEMORY BACKUP:
 RAM  to CARD : PRESS OK
 RAM  Protect : ☒
 CARD to RAM  : PRESS OK
 RAM  to MIDI : PRESS OK
 MIDI to RAM  : PRESS OK
 PEDAL INPUT:
 Function:       Bypass
 ANALOG ADJUST
 In Fine L   :   0.0dB
 In Fine R   :   0.0dB
 Out Fine L  :   0.0dB
 Out Fine R  :   0.0dB
```

Basic operation
- Use the MENU keys to select parameter.
- Use the ADJUST wheel to change values.

Display
Viewing Angle
Adjust for best contrast on the LCD display.

Timing Calculations
Based on fps.
The delay in the In page 1. of the In block is displayed in both frames pr second and milliseconds. The relationship between these parameters is setup in Timing Calculations.
For example – 25 frames per second means that 1 Frame equals 40 milliseconds.

RS 485 CTRL.
Remote change of presets is implemented in the DBMAX by using a RS485 controller.
A PC or Macintosh computer may therefore easily control the system.

The command structure for a Program Change is
#AA,<cmd>,<value><CR>

AA is Unit Address number as set on the Utility page. cmd is command PRE for preset no., BYP for by-pass.

Pinout of the 5-way DIN connector:
(All three connectors carry the same RS485 I/O capability)
Data + : Pin no 3
Data - : Pin no 1
Common : Pin no 2 (Only on Thru and Output connectors)

Security
To security-lock the DBMAX, press OK while this parameter is selected.

Lock
When locked, you will have to dial the PIN-code shown below to access the DBMAX.

UTILITY

Your PIN-code
Set your PIN-code for the security lock by dialing the ADJUST
wheel (See page 36).
If you should forget your PIN-code, please enter the Reset page.
This will release the DBMAX from the locked state.
(You do not have to run any of the reset functions)

A keyboard lock facility is also provided. Press and hold the
Help key for about 3 seconds, and all keys will be locked
including the ADJUST wheel. The display will say *locked* in the
top line. To unlock the keyboard, press Help again for about 3
seconds.

Memory Backup

RAM to Card
Insert a PC Card in the card slot and press OK.
A backup of all RAM presets and User Ref. Levels setups will
now be stored to the memory card.

RAM protect
If you accidently select Card to RAM, when your intention was
to select RAM to Card, the entire RAM will be overwritten.
To avoid this unpleasant scenario you can use the RAM protect
function. If this function is enabled you will not be allowed to
overwrite the RAM bank.

Card to RAM
Insert the PC Card containing your presets and press OK.
All RAM presets and User Ref. Levels setups stored on the
card will now be transmitted to the DBMAX
Warning:
This action will destroy all existing RAM presets of the DBMAX.

RAM to MIDI
Connect your DBMAX's MIDI Output to another DBMAX, a
sequencer or any other MIDI recording device. Press OK and the
DBMAX will perform a MIDI bulk dump of all RAM presets.

MIDI to RAM
Connect the storing device to the DBMAX's MIDI Input and
press OK. The DBMAX is now ready to receive a MIDI bulk
dump containing RAM presets.

Pedal Input

Function
Select between: External Fader/Fade up-down/Bypass/Preset.

Analog Adjust

In Fine L
Fine adjust for the Left channel Input. This parameter may be
trimmed in 0.1dB steps.

In Fine R
Fine adjust for the Right channel Input. This parameter may be
trimmed in 0.1dB steps.

Out Fine L
Fine adjust for the Left channel Output. This parameter may be
trimmed in 0.1dB steps.

Out Fine R
Fine adjust for the Right channel Output. This parameter may be
trimmed in 0.1dB steps.

RESET PAGE

Store and load your own default settings

Enter User data page

Reset system parameters

Clear all user presets

Test Programs

```
RESET
▶LOAD USER DEFAULT  OK
 STORE USER DEF.    OK
 SET USER NAME      OK
 RESET SYS PARAM.   OK
 CLEAR ALL PRESETS  OK
 RUN TEST PROGRAM   OK
```

Type your name here

and your phone number

```
USER DATA
▶NAME: Albert E
 PHONE: 123456789
C  A B C D E F G H I J K L M N
A  O P Q R S T U V W X Y Z 1 2 3
P  4 5 6 7 8 9 0 - + : ◀ ▶ DONE
```

DONE
Confirms/enters the printed data

Basic operation
- Enter the Reset page by holding the BYPASS key while power-up.
- Press and hold the BYPASS key while powering up.
- Move the cursor using the MENU keys and press OK to select reset type.

Load User Default
This will reset all system parameters back to a default setup made by you (see Store User Def.). This reset will NOT delete the user presets of the DBMAX.

Auto-Load User Default
User defaults (= all settings) can be recalled on every power up of the machine automatically by selecting the AUTO load function. To activate the Auto Load Function:
• Place cursor a "Load User Default"
• Turn ADJUST wheel to select "Auto".
With Auto-Load enabled the machine can be powered up in a completely known state on every power-up.

Store User Def.
When you have a perfect setup of your DBMAX, you are able to store this as your own default setup. This function is very useful for example when you have finished a special production and want to go back to normal.To Store settings using this the function:

• In "normal operation mode", not the Reset page, setup all your preferred settings (Preset, Ref. Levels, Utility parameters, Sync etc.).
To access the Store facility you must enter the Reset page:
• Power down the machine - all settings are kept.
• Power up the machine holding the BYPASS key.
• Select "Store User Def" and press OK.
The User Default includes all system parameters.

Set User Name and Phone number
Store your name and phone number in the DBMAX.
- Press OK to access the user data menu.
- Use the MENU keys to move cursor between the name and phone-number lines.
- Use the ADJUST wheel to select letters and confirm each letter with the OK key.
- Select DONE and press OK to end this operation.

Your name and phone number will be displayed during power-up.

RESET PAGE

Reset System Parameters
This will reset all system parameters back to the factory default. This reset will NOT delete the user presets of the DBMAX.

Clear all Presets
This will clear all Ram presets.

Run Test Program
Activates the built in Test Program.

Auto-load of Default Settings
User defaults (= all settings) can be recalled on every power up of the machine by selecting the AUTO load function in the Reset menu. The Reset menu is found by holding the BYPASS key during power-up.
Auto-load enables the machine to be in a completely known state on every power-up.

To use the function, first adjust all settings (Preset, Ref. Levels, Utility parameters, Sync etc.) to what you want as Default. Then:

• Power down the machine.
• Power up the machine holding the BYPASS key.
• Select "STORE USER DEF" and press OK.

To Auto-load settings on every power-up, select "AUTO" in the "LOAD USER DEFAULT" line.

WIZARD

The Wizard

To get an easy starting point for your own sound-tailoring you may invoke the Wizard function.

Press the WIZARD key and answer a few questions.

Source type
- Select MUSIC if the source material primarily is music.
- Select VOX if the source material primarily is vocals.
- Select MIX when the vocals and the music in your mix is evenly weighted.

Compression
- Soft program types would be slowly changing signals as found in some Classical music, New age, Ambient etc.
- Medium program types would be normal Film, Radio and TV work, Country and Folk music, AOR types of music.
- Hard program types would be Commercials, Aggressive Pop and Rock music.

Optimized gain
Select "YES" if you want the DBMAX to automatically adjust the Normalizer level.

Application
Select the application type. Choose between Production or On-Air.

The Wizard settings may later be modified (e.g. by adding AGC, EQ etc.) and stored to a RAM location or PCMCIA card.

You press the POWER switch but there is no light

- The POWER switch on the rear panel is switched off.

The Input PPM meters don't peak out

- You are using analog Inputs, but the Input selector in the I/O menu is set to digital in.
- The analog Input level is set too low.

No sound through the DBMAX

- You are using analog Inputs, but the Input selector in the I/O menu is set to digital in.

You cannot turn the power off

- Hold the POWER switch pressed for at least 3 seconds.

You hear a lot of noise on the DBMAX Output

- 8 bit dither is on, go to the out section and select a suitable dither.

Press the BYPASS key while powering up to access the self-test and select " RUN TEST PROGRAM".

Use the ADJUST wheel to scroll through the different self tests.

Key test
Select Key test by pressing OK.
The keys must be pressed in the order they are requested by the DBMAX to pass the test.
Press the HELP key to exit test.

ADJUST wheel test
Select ADJUST wheel test by pressing OK.
Turn the ADJUST wheel to 30 and back to 0 to pass test.
Press the HELP key to exit test.

LED test
Select LED test by pressing OK.
Turn ADJUST wheel to test the LEDs. The test is "ok" when all LEDs are lit.
Press the HELP key to exit test.

Display test
Select Display test by pressing OK.
Press OK to check that all pixels are lit. Press any key to leave the pixel test.
Press OK key again to exit test.

Analog I/O test
Select analog I/O test by pressing OK
Connect both DBMAX analog Outputs to the DBMAX analog Inputs, left to left, right to right, and press OK.
Use balanced cables.
PPM must show -12 dB to pass test.
Press the HELP key to exit test.

Digital I/O test
Select digital I/O test by pressing OK.
Connect the DBMAX's AES/EBU Output to the DBMAX's AES/EBU Input and press OK.
Connect the DBMAX's S/PDIF Output to the DBMAX's S/PDIF Input and press OK.
Connect the DBMAX's ADAT Output to the DBMAX's ADAT Input and press OK.
PPM must show 0dB to pass test.
Press the HELP key again to exit test.

MIDI I/O test
Select MIDI I/O test by pressing OK.
Connect MIDI Out to MIDI In.
Prg. change 1-128 is send out on MIDI thru. Connect this socket to a MIDI compatible device and confirm the Prg. changes.
Press the HELP key to exit test.

Pedal test
Select Pedal test by pressing OK.
Connect a momentary pedal to the pedal socket.
When pressing the pedal, the result should be OK.
When released, the result should be NOT OK.
Press the HELP key to exit test.

PCMCIA Card test
Select PC Card test by pressing OK.
Insert PC Card.
Note that all data on the PC Card will be destroyed.
Press OK to test.
Result reads:
- Low battery - Time to change battery in your PC Card.
- Not Ok - Try the test using another PCMCIA card.
Press the HELP key to exit test.

Battery test
Select Battery test by pressing OK.
Confirm that result is OK.
Press the HELP key to exit test.

System test
Select System test by pressing OK.
Confirm that result is OK.
Result reads:
- EEPROM Not OK - The unit will most likely work ok, the message is for service matters only.
- DSP Not OK - Contact your local dealer.
Press the HELP key to exit test.

Power Off - On to start standard software.

Service note
In case of the unlikely event that the unit needs to be sent in for service, please use the original box AND an outer box.

TECHNICAL SPECIFICATIONS

Digital Inputs and Outputs

Connectors:	XLR (AES/EBU)
	RCA Phono (S/PDIF)
Formats:	AES/EBU (24 bit),
	S/PDIF (20 bit), EIAJ CP-340, IEC 958
Output Dither:	HPF TPDF dither 8-22 bit
Word Clock Input:	BNC, 75 Ohm, 0.6 to 10 Vpp
Sample Rates:	32 kHz, 44.1 kHz, 48 kHz
Processing Delay:	0.5 ms @ 48 kHz
Frequency Response DIO:	DC to 23.9 kHz ± 0.01 dB @ 48 kHz

Sample Rate Conversion

Type:	Asynchronous
Dynamic Range:	120 dB
THD+N:	-106 dB 44.1 to 48 kHz @ 1 kHz, -2 dBFS
Input Rate Range:	31 kHz to 49 kHz

Analog Inputs

Connectors:	XLR balanced (pin 2 hot)
Impedance:	20 kOhm (balanced)
Max. Input Level:	+27 dBu (balanced)
Min Input Level (for 0 dBFS):	-4 dBu (balanced)
A to D Conversion:	24 bit (1 bit, 128 times oversampling)
A to D Delay:	0.8 ms @ 48 kHz
Dynamic Range:	>103 dB (unweighted), >106 dB(A)
THD:	-95 dB (0.0018 %) @ 1 kHz,
	-6 dBFS (FS @ +18 dBu)
Frequency Response:	10 Hz to 20 kHz: +0/-0.2 dB
Crosstalk:	<-80 dB, 10 Hz to 20 kHz
	typical -100 dB @ 1 kHz

Analog Outputs

Connectors:	XLR balanced (pin 2 hot)
By-pass:	Through relay
Impedance:	40 Ohm (balanced)
Max. Output Level:	+26 dBu (balanced)
Full Scale Output Range:	-4 dBu to +26 dBu (balanced)
D to A Conversion:	24 bit (1 bit, 128 times oversampling)
D to A Delay:	0.57 ms @ 48 kHz
Dynamic Range:	>100 dB (unweighted), >104 dB(A)
THD:	-86 dB (0.005 %) @ 1 kHz,
	-6 dBFS (FS @ +18 dBu)
Frequency Response:	10 Hz to 20 kHz: +0/-0.5 dB
Crosstalk:	<-60 dB, 10 Hz to 20 kHz
	typical -90 dB @ 1 kHz

EMC

Complies with:	EN 55103-1 and EN 55103-2
	FCC part 15, Class B
	CISPR 22, Class B

Safety

Certified to:	IEC 65, EN 60065, UL 1419 and CSA E65

Environment

Operating Temperature:	32° F to 122° F (0° C to 50° C)
Storage Temperature:	-22° F to 167° F (-30° C to 70° C)
Humidity:	Max. 90% non-condensing

PCMCIA Interface

Connector:	PC Card, 68 pin type 1 cards
Standards:	PCMCIA 2.0, JEIDA 4.0
Card Format:	Supports up to 2 MB SRAM

Control Interface

RS485/RS422:	5 Pin DIN
MIDI:	In/Out/Through: 5 Pin DIN
GPI, Pedal, Fader:	1/4 inch phone jack

General

Finish:	Anodized aluminum face and top plate
	Plated and painted steel chassis
LCD:	56 x 128 dot graphic LCD-display
Dimensions:	19" x 1.75" x 8.2" (483 x 44 x 208 mm)
Weight:	5.2 lb. (2.35 kg)
Mains Voltage:	100 to 240 VAC, 50 to 60 Hz (auto-select)
Power Consumption:	<20 W
Backup Battery Life:	>10 years
Warranty, Parts and labor:	1 year

**Technical Specifications are subject
to change without notice !**

The unit is shipped with a number of factory presets identified as ROM on the Recall page.

Presets are only meant as starting points. We urge you to tailor the sound to the application or profile you want. With a couple of changes, On-Air presets may be adopted for production or mastering or vice versa.

Before having a tour through the presets, first load a proper level setup in the Ref. Levels page.
For permanent installations also trim analog Outputs in 0.1dB increments to achieve precise in situ interfacing.

Film and Post Production

For Film and Post Production applications you should first go to the Ref. Levels page and load a suitable setup, e.g. EBU Broadcast or Film Mastering. The Delay on Input page no. 1 should be set between 3 and 10 ms and turned ON.

Remember to setup appropriate Dither on the Out page if you use digital Outputs. The receiving device will have a preference for a given resolution from the DBMAX.

For mastering applications, the DBMAX can give you a 100% overshoot free overload protection satisfying either analog or digital metering standards. You may also simultaneously level maximize your sound.

Apart from the many Limiting and Compressor/Limiter mastering presets, some production presets are meant for recording. In Film Production old noise reduction systems are sometimes used for dialog clean-up. In the DBMAX we've emulated some of the machines on presets like CleanUp 100% and CleanUp Cat43. Also a couple of special effects are available.

If you want to offset the spectral balance (Eq) of low level signals, use the Band Levels on page no. 2 of the Compressor block. If you want to off-set the spectral balance of high level signals, use the Threshold and Ratio on page no. 2 of the Compressor block.

Film and CD Mastering

For Film and Post Production applications you should first go to the REF LEVELS page and load a suitable setup, e.g. EBU Broadcast, Film Mastering or CD Mastering. Also check that the Hi-Cut filters on Input page no. 2 are not activated, and the

Delay on Input page no. 1 is set between 3 and 10 ms and turned ON.

Remember to setup appropriate Dither on the Out page if you use digital Outputs. The receiving device will have a preference for a given resolution from the DBMAX.

For final limiting at the Output, the Production Limiter would typically be used with a PPM response for Film Mastering and a TX response for CD Mastering. By balancing the Limiter Threshold and the Soft Clipper, different results may be obtained. To create a good Mono master from a stereo source, try using the EBU90*Mono preset.
To adjust the Stereo Width you may use the MS Encoder + MS Decoder in that sequence and offset the M/S balance. Gain should be made up with e.g. the Normalizer.

If you want to offset the spectral balance (Eq) of low level signals, use the Band Levels on page no. 2 of the Compressor block. If you want to offset the spectral balance of high level signals, use the Threshold and Ratio on page no. 2 of the Compressor block.

Broadcast Continuity

For Continuity applications you should first go to the Ref. Levels page and load a suitable setup, e.g. EBU Broadcast. The Delay on Input page no. 1 should be set between 2 and 3 mS and turned ON.

You may wish to add further delay for link compensation etc. Use the same Delay control on this page, but generally avoid reducing it to less than 1ms. The Delay is also shown in Frames on the Input page. The calculation is based on the fps. setting in the Utility page.

Remember to setup appropriate Dither on the Out page if you use digital Outputs. The receiving device will have a preference for a given resolution from the DBMAX.

As a starting point for a unity gain limiter in an EBU environment, first load the EBU Broadcast setup, then the EBU Limiter preset.

The 5-band Limiter will provide full Output protection for Input signals up to 0dBFS or +18dBu.
As an example, distortion figures for digital I/O applications are

given for the EBU Limiter Preset running the EBU Broadcast setup.

THD+N@40Hz: -124dB for -18dBFS in, -96dB for -9dBFS in, -90dB for 0dBFS in.

THD+N@1kHz: -124dB for -18dBFS in, -99dB for -9dBFS in, -96dB for 0dBFS in.

THD+N@20kHz: -124dB for -18dBFS in, -124dB for -9dBFS in, -122dB for 0dBFS in.

Mono generation is accomplished by the EBU 90 degree Mono preset. You may build additional inserts like AGC, EQ, De-esser etc. into the presets.

All presets exist in two versions: The On-Air versions have brick-wall Output peak handling set at Abs. Peak Max. The Production versions have DIN45406 peak handling set at Abs. Peak Max. -3dB.

If you want to off-set the spectral balance (Eq) of low level signals, use the Band Levels on page no. 2 of the Compressor block. If you want to off-set the spectral balance of high level signals, use the Threshold and Ratio on page no. 2 of the Compressor block.

Transmission

For Transmission applications you should first go to the REF LEVELS page and load a suitable setup, e.g. EBU Broadcast or digital TX. Also check that the Hi-Cut filter on Input page no. 2 are positioned correctly, and the Delay on Input page no. 1 is set between 2 and 3 ms and turned ON.

For DAB applications the Hi-Cut filter should be turned off. For NICAM applications normally only turn on the Lo-Cut filter at the In page no. 1.

For FM transmission we recommend setting the Lo-Cut filter between 20 and 40Hz. If you use a digital composite generator, normally the DBMAX should handle Emphasis generation, HF Limiting and Soft Clipping to maximize the signal and avoid overshoots. Emphasis should be generated as a combination of tuning band 3-5 Threshold/Ratio settings in the Compressor and the TX Limiter in Insert 4.

FM transmission is by nature a trade-off between Level, HF amount and Distortion. If you insist on a high sound level, please bear in mind that an overly clipped or multi-band manipulated signal may easily create listening fatigue.

It may prove wiser to back off a couple of dB in order to get a cleaner and brighter sound.

When you use the built-in Dynamic Emphasis capability in the DBMAX, please observe that Emphasis is NOT indicated on the digital Outputs, because the AES/EBU specification has no definition of 50μs or 75μs Emphasis.

For a digital transmission like in a NICAM or DAB environment, setup appropriate Dither on the Out page. The receiving device will have a preference for a given resolution from the DBMAX.

For redundancy in Transmission, an Input relay by-passes the unit in event of power failure.

We are currently evaluating different digital stereo generators in order to match the characteristics of the reconstruction filter in selected devices.

If you have specific requirements or information about your setup, feel free to contact TC Electronic at *info@tcelectronic.com*

The DBMAX for mastering is a very potent tool. Please be careful not to overmaximize your source material just because you can.

Listening fatigue is typically the consequence of a very dense sound image.

AES/EBU
Professional digital in/out standard, using balanced XLR cables. The AES/EBU format can output 24 bit 96kHz.

S/PDIF
Consumer digital in/out standard, using coaxial phono-type cables. This format can generally output 20 bit 48kHz. TC products can output all 24 bits on S/PDIF.

Tos-link
Also called optical S/PDIF. Two channels of 24 bit, 96kHz can be transferred with this format.

ADAT/TDIFF
Format capable of transferring 8 channels of 24 bit 48kHz, using optical cables.

Brickwall type limiter
A type of limiter that allows absolutely no signal above threshold.

Bits & Bytes
1 bit is the smallest unit for information in the digital world. Its value can be can be 0 or 1 or you could say on/off. 1 byte=8 bit.

Compressor Overshoot
When slow Attack times are used overshoots might occur. This causes an unwanted click/distortion and. To prevent compressor overshoots you can use a brickwall type limiter.

Cross-over point
Splitpoint indicating where the different bands begins/stops working.

dBFS
dB full scale. 0dBFS is the absolute max in the digital world. Any signal above 0dBFS will cause serious unwanted distortion.

dBu
Measuring unit in the analog world.
0dBu=0,775V in 600ohm

dBv
Measuring unit in the analog world.
0dBv is 1V in 600 ohm.

De-essing
An algorithm that removes unwanted "esses" or sibilance from vocal material.

Dither
Going from one type of bit resolution to a lower, e.g. from 24 bit to 16 bit, you actually loose 8 bits of information. The process of cutting off bits is called truncation and it introduces digital distortion of low level signals, due to the lack of complete signal information. To compensate for this, dither must be applied. Dither is a small amount of filtered noise that generates randomization at the noise floor ensuring a less distorted low level signal. Dithering is relevant only on digital Outputs and it is always the receiving device that determines the number of bits you must dither to. A DAT or CDR recorder should normally be Dithered to 16 bit.

House Clock
A separate piece of equipment used only to generate a common standard clock keeping all the attached digital equipment in sync.

Master Clock
If you don't use a separate House Clock you can use most digital units for the same purpose. In this case the unit you sync to is called the Master Clock.

Make up gain
To optimize the output gain and energy in your material auto Make-Up gain can be used to gain the compressed band automatically.

Sample Rate
The quality of sound depends on how precise you can measure the analog signal. Measuring is done by taking "pictures" of the wave at a given rate: The Sample Rate. Since you need two points to define a sinus curve, the maximum frequency that can be successfully reproduced is the Sample Rate divided by two. E.g. the max frequency that can be successfully reproduced with a Sample Rate of 48kHz is 24kHz.

De-essing
An algorithm that removes unwanted "esses" or sibilance from vocal material.

System Exclusive MIDI Commands
Device-dependent MIDI commands, normally used for remote controlling machines.

Pre-emphasis
Pre-emphasis is used during broadcast to boost the high frequency area. The receiving device compensates by attenuating the same frequency area.

This equipment has been tested and found to comply with the limits for a Class B Digital device, pursuant to part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• *Reorient or relocate the receiving antenna.*
• *Increase the separation between the equipment and receiver.*
• *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
• *Consult the dealer or an experienced radio/TV technician for help.*

The user may find the following booklet, prepared by the Federal Communications Commission, helpful:
"How to identify and Resolve Radio/TV interference Problems."

This booklet is available from the US. Government Printing Office, Washington, DC 20402, Stock No. 004-000-0034-4.

Caution:
You are cautioned that any change or modifications not expressly approved in this manual could void your authority to operate this equipment.

For the customers in Canada:
This Class B Digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

Caution:
Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Certificate Of Conformity

TC Electronic A/S, Sindalsvej 34, 8240 Risskov, Denmark, hereby declares on own responsibility that following product:

DBMAX Digital Broadcast Processor

- that is covered by this certificate and marked with CE-label conforms with following standards:

EN 60065   Safety requirements for mains operated Electronic and related apparatus for household and similar general use.

EN 55103-1   Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.
Part 1: Emission.

EN 55103-2   Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.
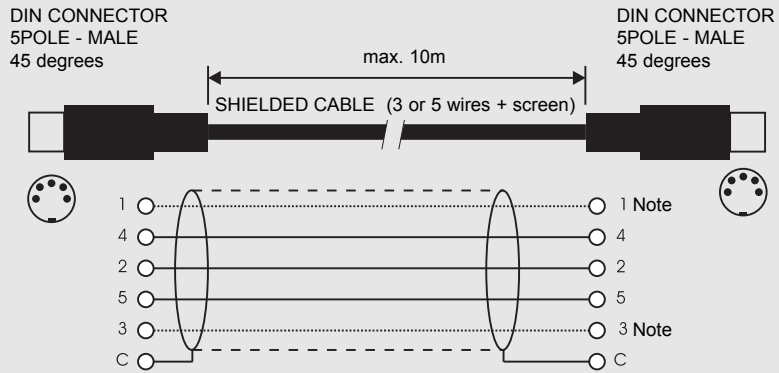Part 2: Immunity.

With reference to regulations in following directives:
73/23/EEC, 89/336/EEC

Issued in Risskov, February 1th 1998

Anders Fauerskov
Managing Director

APPENDIX *Soldering instructions*

MIDI Cable

DIN CONNECTOR
5POLE - MALE
45 degrees

DIN CONNECTOR
5POLE - MALE
45 degrees

max. 10m

SHIELDED CABLE (3 or 5 wires + screen)

1		1 Note
4		4
2		2
5		5
3		3 Note
C		C

NOTE!
On TC units with RS485 interface pins 1 and 3 on the DIN connectors are reserved for RS485 connection. Therefore, if you are connecting the unit to other equipment that use these pins, please make sure to use 3-wire standard MIDI type cable (not a five wire MIDI-PLUS type).

Pedal Cable

PEDAL SWITCH or similar

JACK PLUG
Mono - male
Ø 6.35mm, 1/4"

max. 100m

2 wires

Switch must be
momentary type

Shield/ground

Tip

Fader Cable

JACK PLUG
Mono - male
Ø 6.35mm, 1/4"

max. 100m

2 wires

MASTER FADER or similar

XLR - XLR

Pin 1 - Pin 1 (Ground)
Pin 2 - Pin 2 (Hot)
Pin 3 - Pin 3 (Cold)
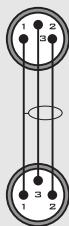
Jack (unbalanced) - XLR

Sleeve - Pin 1 (Ground)
Tip - Pin 2 (Hot)
Sleeve - Pin 3 (Cold)

TIP
GND

Jack (balanced) - XLR
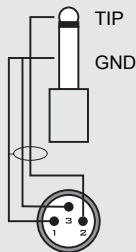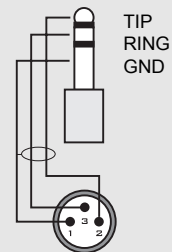
Sleeve - Pin 1 (Ground)
Tip - Pin 2 (Hot)
Ring - Pin 3 (Cold)

TIP
RING
GND

PRESET LIST

Presets for Mastering and Production

No	Name	Main Function	Typical Level Setup	Applications
1	EBU Limiter	Limiter, Europe	EBU Broadcast	OB, PP
2	NAB Limiter	Brickwall Limiter, US	NAB Broadcast	OB, PP
3	EBU Comp & Lim	Optimize & Limit, Europe	EBU Broadcast	OB, PP
4	NAB Comp & Lim	Optimize & Limit, US	NAB Broadcast	OB, PP
5	EBU Mix Pilot	Mix Assist & Limit, Europe	EBU Broadcast	OB, PP
6	NAB Mix Pilot	Mix Assist & Limit, US	NAB Broadcast	OB, PP
7	CD Master	Optimize & Limit	CD Mastering	CD
8	Film Limit	Limiter	Film Mastering	MA
9	Film to Video	Low level boost & Limit	NAB Broadcast, NAB DTV	PP, BC
10	Finalizer	Optimize & Limit	CD Mastering	CD, PP
11	Finalizer 2Band	Optimize & Limit	CD Mastering	CD, PP
12	Finalizer 5Band	Optimize & Limit	CD Mastering	CD, PP
13	Trailer	Optimize & Limit	NAB Broadcast	PP, MA
14	Commercial	Optimize & Limit	NAB Broadcast	PP
15	Propaganda	Optimize & Limit	NAB Broadcast	PP
16	NICAM ProdLim	Limiter	EBU Broadcast	PP
17	De-Esser	Voice Processor	NAB Broadcast	PP
18	De-Wow	Voice Processor	NAB Broadcast	PP
19	CleanUp Cat43	Noise Removal	CD Mastering	PP

Presets for Webcast and Web Authoring

No	Name	Main Function	Typical Level Setup	Applications
20	EBU Webcast	Codec optimize, Europe	EBU Webcast	WC
21	NAB Webcast	Codec optimize, US	NAB Webcast	WC
22	EBU WebMax	Codec loud, Europe	EBU Webcast	WC
23	NAB WebMax	Codec loud, US	NAB Webcast	WC
24	EBU WebTx Mono	Mono web TX, Europe	EBU Webcast	WC
25	NAB WebTx Mono	Mono web TX, US	NAB Webcast	WC
26	EBU WebTx 128k	Restr. BW web TX, Europe	EBU Webcast	WC
27	NAB WebTx 128k	Restr. BW web TX, US	NAB Webcast	WC
28	EBU WebTx 56k	Restr. BW web TX, EU	EBU Webcast	WC
29	NAB WebTx 56k	Restr. BW web TX, US	NAB Webcast	WC

Presets for Digital Television and Linking

No	Name	Main Function	Typical Level Setup	Applications
30	EBU Tx Limit	Brickwall Limiter, Europe	EBU Broadcast	BC, DL, DT
31	NAB Tx Limit	Brickwall Limiter, US	NAB Broadcast	BC, DL, DT
32	EBU Tx AGC	Optimize & Limit, Europe	EBU Broadcast	BC, DL, DT
33	NAB Tx AGC	Optimize & Limit, US	NAB Broadcast	BC, DL, DT
34	EBU Com. DTV	Opti level, width & Limit	EBU Broadcast	BC, DL, DT
35	NAB Com. DTV	Opti level, width & Limit	NAB Broadcast	BC, DL, DT
36	EBU Link	Wide range Opti & Limit	EBU Broadcast	DL, WC
37	NAB Link	Wide range Opti & Limit	NAB Broadcast	DL, WC
38	EBU OptiLink	Wide range Opti & Limit	EBU Broadcast	DL, WC
39	NAB OptiLink	Wide range Opti & Limit	NAB Broadcast	DL, WC

PRESET LIST

Presets for Digital and FM Radio

No	Name	Main Function	Typical Level Setup	Applications
40	DAB	Optimize & Limit	EBU Broadcast	BC, DR
41	DAB <AGC>	Optimize & Limit	EBU Broadcast	BC, DR
42	Classical DAB	Optimize & Limit	EBU Broadcast	BC, DR
43	FM Subtle	Opti level, width & Limit	FM Generator	FM, RO, WC
44	FM Wide	Opti level, width & Limit	FM Generator	FM, RO, WC
45	FM Moderate	Opti level, width & Limit	FM Generator	FM, RO, WC
46	FM AOR	Opti level, width & Limit	FM Generator	FM, RO, WC
47	FM Energy	Opti level, width & Limit	FM Generator	FM, RO, WC
48	Studio Outlet	Optimize & Limit	Studio Outlet	RO
49	Energy Outlet	Optimize & Limit	Studio Outlet	RO

Presets for OB and Live Broadcast

No	Name	Main Function	Typical Level Setup	Applications
50	Live Sports 1	Mix Assist & Limit	NAB Broadcast	OB
51	Live Sports 2	Mix Assist & Limit	NAB Broadcast	OB
52	Gameshow 1	Mix Assist & Limit	NAB Broadcast	OB
53	Gameshow 2	Mix Assist & Limit	NAB Broadcast	OB
54	Talk 5Band	Voice Processor	NAB Broadcast	OB, PP

Presets for off-air Confidence Monitoring

No	Name	Main Function	Typical Level Setup	Applications
55	Mon NICAM	Monitor	EBU Broadcast	PP
56	Mon FM Stereo	Monitor	EBU Broadcast	PP
57	Mon FM Mono	Monitor	EBU Broadcast	PP
58	50us Converge	Emphasis pre-adjust	EBU Broadcast	BC, OB
59	75us Converge	Emphasis pre-adjust	EBU Broadcast	BC, OB

Presets for Special Effects

No	Name	Main Function	Typical Level Setup	Applications
60	Optical 35mm	Optical film sound emulate	Film Mastering	PP, MA
61	Optical 35mm-2	Optical film sound emulate	Film Mastering	PP, MA
62	Optical 16mm	Optical film sound emulate	Film Mastering	PP, MA
63	Optical 16mm-2	Optical film sound emulate	Film Mastering	PP, MA
64	Intercom	Voice Processor	NAB Broadcast	PP
65	Telephone	Voice Processor	NAB Broadcast	PP

Abbreviations

BC: Broadcast Continuity
D: Mastering
DX: Digital Transmission & Link
OB: Outside Broadcast & Live Production
PP: Post Production
RO: Radio Studio Outlet
**VE:** Audio for Video Editing

MASTER FADER

Why Make a Master Fader?

If a fade is performed before the DBMAX, the Compressor will try to increase the level as the fade decreases. To avoid this problem, fades must always be done after the DBMAX. The Master Fader makes it possible to perform a manual fade on the very Output of the DBMAX, enabling you to keep your fade in digital domain and ensuring perfect tracking of Left and Right.

Connecting and Calibrating the Master Fader

In order to work the Master Fader accurately, the DBMAX must be calibrated:

- Connect the Master Fader to the "External Controller" jack of the DBMAX.
- Press and hold the BYPASS key of the DBMAX while powering up.
- Scroll down to "Fader Calibration" using the MENU keys, and press the OK key.
- Move the Master Fader to maximum position. To compensate for mechanical tolerances draw back the Master Fader slightly.
- Press OK
- Move the Master Fader to minimum position. To compensate for mechanical tolerances draw back the Master Fader slightly.
- Press OK
- The Master Fader is now Calibrated. Turn power On/Off.
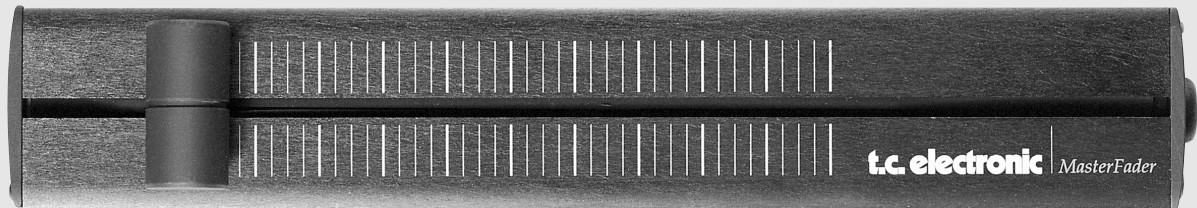
Activating the Master Fader

To activate the Master Fader, enter the Utility menu and scroll down to "Pedal Input Function" using the MENU keys. Dial the ADJUST wheel to choose "Ext. Fader".
The Master Fader is now controlling the digital Fader of the DBMAX. The Fader located in the DBMAX Output section will now follow, and display the movement and the exact level of the Master Fader.

Cables and Lengths

The Master Fader uses standard mono jack cables. The cable can be extended using the jack to jack adapter, and can run at cable lengths up to 100 meters. Remember to recalibrate after extending the cable.