Multichannel Mastering Console MMC 2

Sources

Stereo Input A | Stereo Input B
Stereo Return A | Stereo Return B
M-CH. Input A | M-CH. Input B
M-CH. Return A | M-CH. Return B
M-CH. Return C | M-CH. Return D

Speaker Management

Solo to Center | L | C | R | LS | RS | LFE | $L_{t/o}$ | $R_{t/o}$ | LFE to L/C/R

Solo | Solo | Solo | Solo | Solo | Solo | Solo | Solo

Mono L/R | Stereo Operation | Mono LS/RS | M-CH. Operation | Mono $L_{t/o}/R_{t/o}$

Monitors

Stereo A | Dim Dim 1 -10 dB
Stereo B | Dim 2 -20 dB
M-CH. A | Dim 3 -30 dB
M-CH. B | Mute

Insert On | Return On
Insert | Return

SPL

MMC 2

Multichannel Mastering Console

Master Fader

Monitor Level

Model 2486

1	ø Rev	2	ø Rev
L	Trim On	R	Trim On
3	ø Rev	4	ø Rev
C	Trim On	LFE	Trim On
5	ø Rev	6	ø Rev
LS	Trim On	RS	Trim On
7	ø Rev	8	ø Rev
$L_{t/o}$	Trim On	$R_{t/o}$	Trim On

Input

1	Fader On	2	Fader On
L	Trim On	R	Trim On
3	Fader On	4	Fader On
C	Trim On	LFE	Trim On
5	Fader On	6	Fader On
LS	Trim On	RS	Trim On
7	Fader On	8	Fader On
$L_{t/o}$	Trim On	$R_{t/o}$	Trim On

Output

Manual
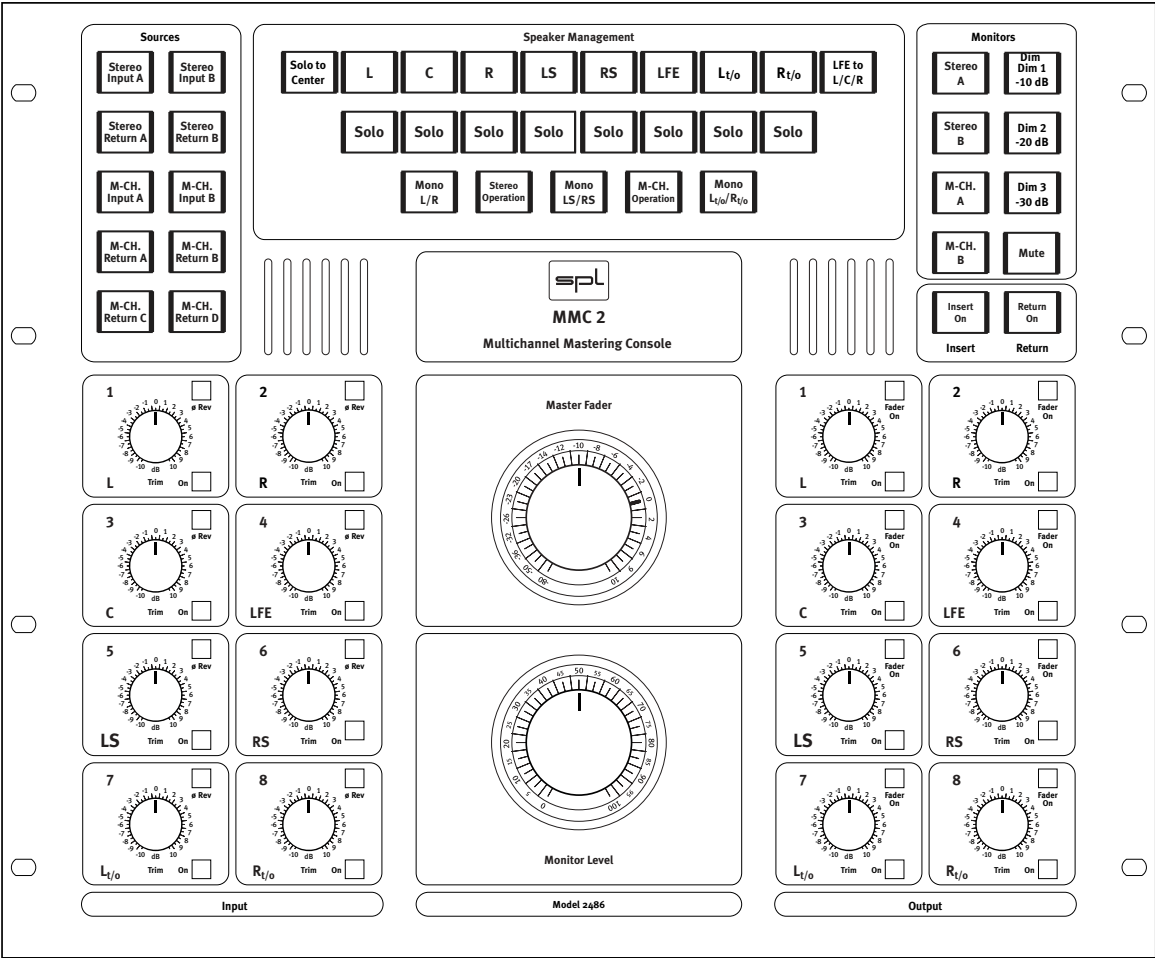
SPL

Manual Version 1, 10/2005

R & D: Wolfgang Neumann

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# Contents

Installation/Security Advices

Before you operate the unit, first check carefully whether the local voltage setting corresponds to the setting on the external transformer!

Before switching on external transformer and MMC 2, the MMC 2 must be connected to the external transformer with the supplied multicore lead. Pay attention to a secure connection.

The MMC 2 and the external transformer should be situated away from heat sources and direct sunlight. MMc 2 and transformer need sufficient air circulation. Avoid installation in environments exposed to vibrations, dust, heat, cold, moisture or electrical and magnetic fields.

Do not install the unit in proximity to power amplifiers or digital processors. You may consider placing it near other analog gear. Such placement can prevent interference from Word Clock, MIDI, etc.

- Do not open the case. You may risk severe electric shock and may damage your equipment.

- Leave repairs and maintenance to a qualified service technician. Should any objects fall inside the case, unplug the power supply and contact a qualified technician.

- To avoid electric shock or fire hazards do not expose the unit to rain or dampness.

- In case of lightning unplug the power supply.

- Never force a switch or knob.

- Use a lint-free cloth for cleaning. Avoid any cleaning agents as they may damage the finish, use an acid-free cleaning oil instead.

- Support the back of the unit when it is being mounted.

spl

Master Fader
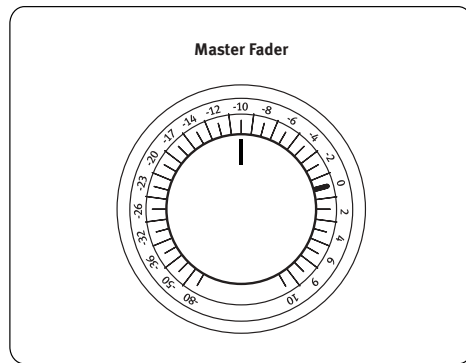
The MMC 2 multichannel mastering console completes the range of SPL 120 V mastering consoles. Housed in a 19"/11U rack mount chassis the MMC 2 features the same unique 120 volts rails like the MMC 1 and DMC dual-channel mastering console to achieve the optimum audio performance.

The purpose of the development was the creation of mastering consoles that would be superior in audio quality to all known and foreseeable audio formats, whether analog or digital. Such consoles would provide both for an unaltered reproduction of the sonic quality of high resolution playback formats like SACD and in the process, remain a safe capital investment for many years.

The MMC 2 is conceived as the center of a mastering environment to provide speaker management, sources and returns connectivity, input and output trimming, pure analog multichannel master fader and monitor level setting. As an option, the MMC 2 can be supplemented with the SPL MasterBay to provide an automated 8 x 8 channel insert routing of external processors.

Digital audio formats have undergone continuous development and change and will continue to do so. With the degree of incompatibility created by the "format war" between PCM and DSD, the need for a technology that is superior in dynamic range, headroom and sound quality to either or any other such format is obvious – and the only solution is discrete analog technology in its most advanced implementation.

Moreover additional prerequisites speak for the employment of high-performance analog technology:

The number of necessary AD/DA conversions should be reduced to a minimum. With the MMC 2, digital sources can be connected to a digital router, which outputs the selected source through the preferred DA converter. This ensures that the sound quality remains comparable and is not affected by converter differences.
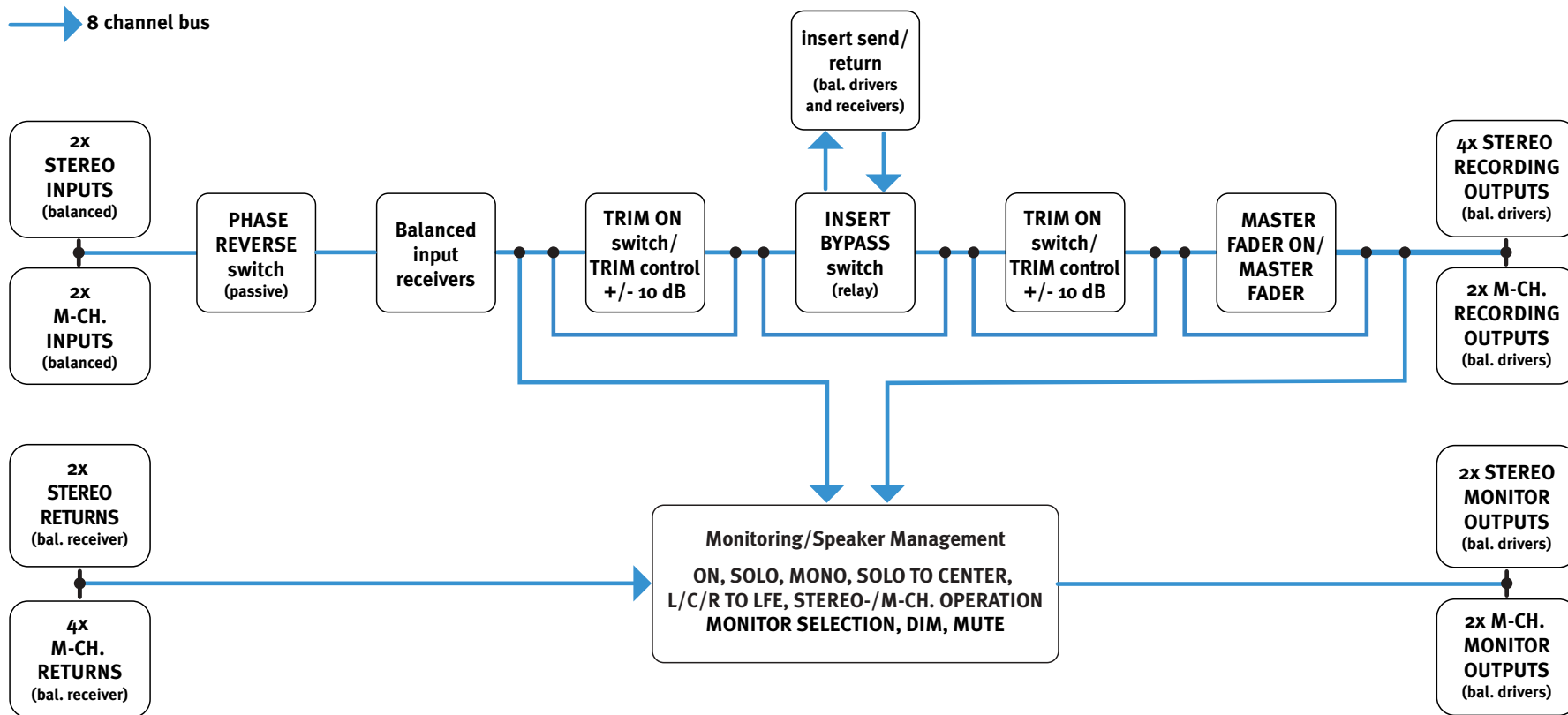
High quality analog outboard processing consistently proves itself superior to digital processing. The analog concept allows for problem-free integration of such analog processors.

Monitors and power amplifiers are almost exclusively analog in design. Yet another converter at this point in the chain only degrades monitoring signal paths. Furthermore, DSD signals cannot be monitored on a digital monitoring that operates in PCM.
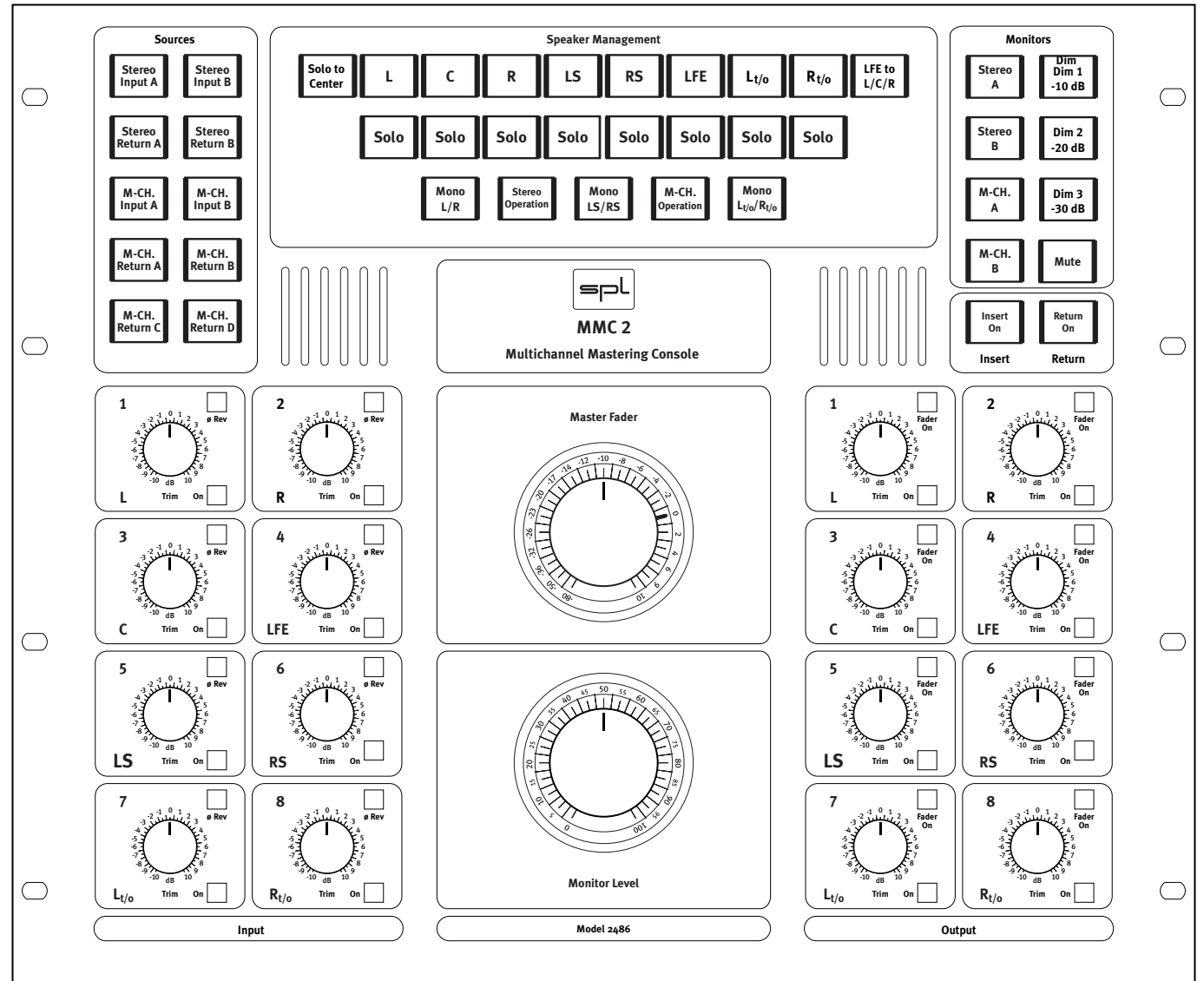
Technology

SPL's new SUPRA operation amplifiers are used throughout the MMC 2's design. They perform at an industry benchmark of 120 volts and their development alone took four years. The SPL SUPRA op amp achieves a signal-to-noise ratio of 116 dB with a headroom of 34 dB. The dynamic range amounts to 150 dB with a frequency bandwidth of 200 kHz.

With such specifications, the MMC 2 rides comfortably beyond the requirements of either the current maximum 24 bit/192kHz PCM or 1 bit/256 fs DSD formats, while a digital technology in which the MMC 2 could become a "bottle neck" is not foreseeable.

→ **8 channel bus**

**insert send/
return**
(bal. drivers
and receivers)

**2x
STEREO
INPUTS**
(balanced)

**2x
M-CH.
INPUTS**
(balanced)

**PHASE
REVERSE
switch**
(passive)

**Balanced
input
receivers**

**TRIM ON
switch/
TRIM control
+/- 10 dB**

**INSERT
BYPASS
switch**
(relay)

**TRIM ON
switch/
TRIM control
+/- 10 dB**

**MASTER
FADER ON/
MASTER
FADER**

**4x STEREO
RECORDING
OUTPUTS**
(bal. drivers)

**2x M-CH.
RECORDING
OUTPUTS**
(bal. drivers)

**2x
STEREO
RETURNS**
(bal. receiver)

**4x
M-CH.
RETURNS**
(bal. receiver)

Monitoring/Speaker Management

**ON, SOLO, MONO, SOLO TO CENTER,
L/C/R TO LFE, STEREO-/M-CH. OPERATION
MONITOR SELECTION, DIM, MUTE**

**2x STEREO
MONITOR
OUTPUTS**
(bal. drivers)

**2x M-CH.
MONITOR
OUTPUTS**
(bal. drivers)

Front Panel

Sources

Stereo Input A	Stereo Input B
Stereo Return A	Stereo Return B
M-CH. Input A	M-CH. Input B
M-CH. Return A	M-CH. Return B
M-CH. Return C	M-CH. Return D

Speaker Management

| Solo to Center | L | C | R | LS | RS | LFE | L$_{t/o}$ | R$_{t/o}$ | LFE to L/C/R |

| Solo | Solo | Solo | Solo | Solo | Solo | Solo | Solo |

| Mono L/R | Stereo Operation | Mono LS/RS | M-CH. Operation | Mono L$_{t/o}$/R$_{t/o}$ |

Monitors

Stereo A	Dim Dim 1 -10 dB
Stereo B	Dim 2 -20 dB
M-CH. A	Dim 3 -30 dB
M-CH. B	Mute

| Insert On | Return On |
| **Insert** | **Return** |

spl

MMC 2
Multichannel Mastering Console

1 ø Rev
L Trim On

2 ø Rev
R Trim On

3 ø Rev
C Trim On

4 ø Rev
LFE Trim On

5 ø Rev
LS Trim On

6 ø Rev
RS Trim On

7 ø Rev
L$_{t/o}$ Trim On

8 ø Rev
R$_{t/o}$ Trim On

Input

Master Fader

Monitor Level

Model 2486

1 Fader On
L Trim On

2 Fader On
R Trim On

3 Fader On
C Trim On

4 Fader On
LFE Trim On

5 Fader On
LS Trim On

6 Fader On
RS Trim On

7 Fader On
L$_{t/o}$ Trim On

8 Fader On
R$_{t/o}$ Trim On

Output

spl

Sources

The Sources section provides selection options for several stereo and multichannel input and return sources. The returns are ideally suited to select recorders, DAW, audio players, and so on.

All Input buttons allow for switching between the input monitoring mode and the output monitoring mode. Press once, the input button is permanently illuminated. The output signal after the Master Fader is monitored. Press again, the Input button flashes. The input signal after the input Phase Reverse switch is monitored. This way, you can easily compare what comes in and what goes out of the console.

IMPORTANT: Selecting the return monitoring mode overrules input and output monitoring modes.

NOTE: All MMC 2 buttons allow for individual labeling.
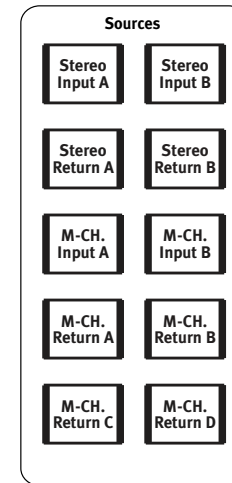
Input Trims

An input selected in the Source section is routed to the Input Trims section. This section provides On and Phase Reverse switches, a high-grade ALPS potentiometer with 41 steps and +/-10dB gain range allows for input trimming.
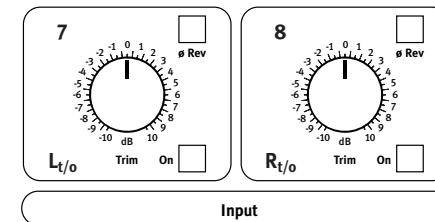
Control Elements

Insert On | **Return On**

Insert | **Return**

Speaker Management

Solo to Center	L	C	R	LS	RS	LFE	L$_{t/o}$	R$_{t/o}$	LFE to L/C/R
	Solo	Solo	Solo	Solo	Solo	Solo	Solo	Solo	

Mono L/R | Stereo Operation | Mono LS/RS | M-CH. Operation | Mono L$_{t/o}$/R$_{t/o}$

Monitors

Stereo A | Dim 1 -10 dB
Stereo B | Dim 2 -20 dB
M-CH. A | Dim 3 -30 dB
M-CH. B | Mute
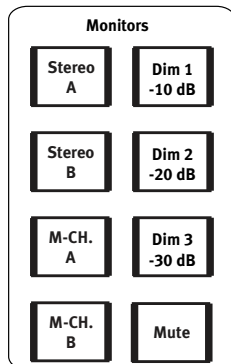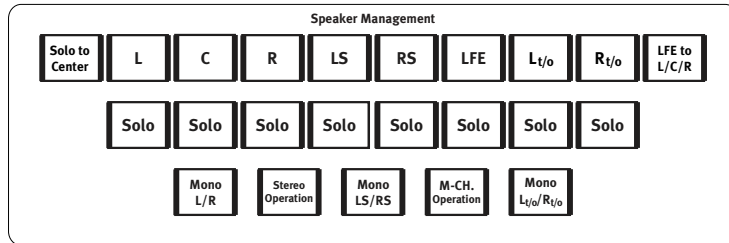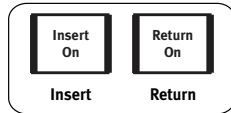
Insert/Return

The MMC 2 offers an Insert/Return point after the Input Trims to include external processing equipment into the signal path.

Monitoring

Monitoring functions comprise a Speaker Management section, a Monitors selection section and the Monitor Level fader.

1. Speaker Management

Each loudspeaker can be activated or deactivated by a dedicated switch, and each is labeled with its respective loudspeaker position.

A Solo switch is placed underneath each speaker switch. To alleviate channel comparisons, a Solo-to-Center function allows for monitoring of each channel through the center speaker. The Solo-to-Center function can only be activated if a speaker is previously switched to solo.

If a surround sound mix does include separate LFE subwoofer signals, the LFE-to-L/C/R switch distributes an LFE signal (factory standard -10 dB level) to the L/C/R channels.

Two Operation Mode buttons are provided to change the MMC 2 configuration from stereo to multi-channel operation. For improved operational safety and to switch off all monitoring functions other than L/R, the Stereo button must be pressed before starting a stereo mastering job.

The Monitor section offers three mono functions: 1. Mono L/R, 2. Mono LS/RS (not available in stereo mode), 3. Mono L t/o / R t/o (not available in stereo mode).

2. Monitors

The Monitors section allows for selection of two stereo and two multichannel speaker sets. Three different Dim levels (-10 dB, -20 dB and -30 dB) and a Mute switch can be activated for the selected set.

Monitor Level

The Monitor Level is controlled with a custom-made eight-tiered potentiometer. The MMC 2 does not employ DACs, step ladders or VCAs for this function, and the specifications of this potentiometer are substantially better than either of these other options ever could be – the maximum tolerance is ‹ 0,5 dB over the entire control range. The control range reaches from -∞ dB to +4 dB.
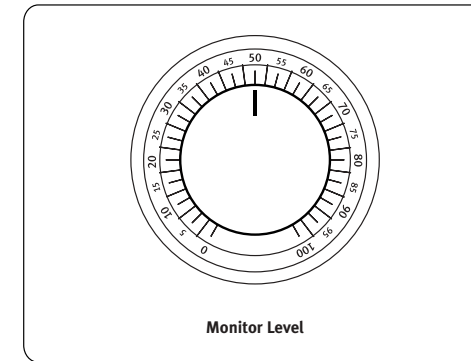
Monitor Level

Master Fader

This fader features the same potentiometer of the Monitor Level for dynamic mastering purposes and fine tuning the overall level from +10 dB to -80 dB.

Each output channel must be activated by the Fader On switch in the respective Output Trim section to be controlled by the master fader.

With this control's extremely fine level settings, the engineer can attain every ounce of recording headroom. The result, thanks to these controls of infinite resolution, is an unparalleled excellence in dynamic mastering.
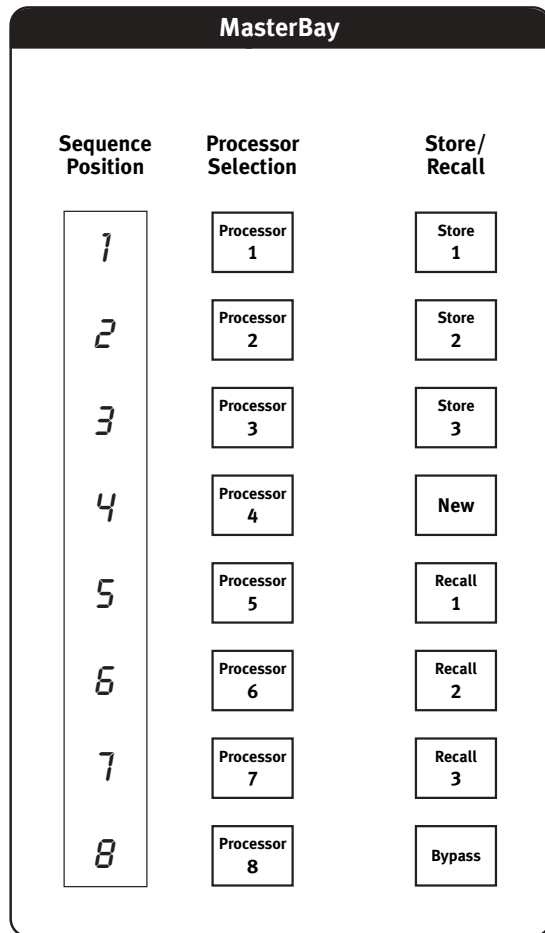
Master Fader
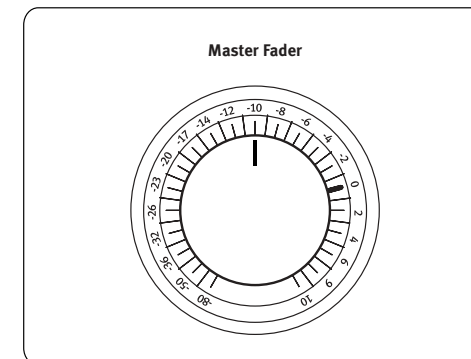
Output Trims

The Output Trims are based on the same high-quality ALPS potentiometers like in the Input section and the gain range also covers +/-10dB. Each out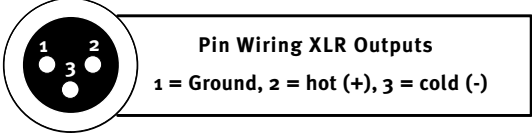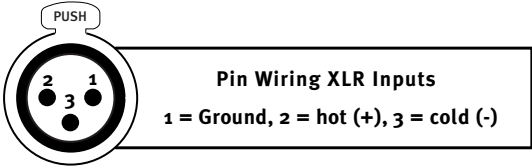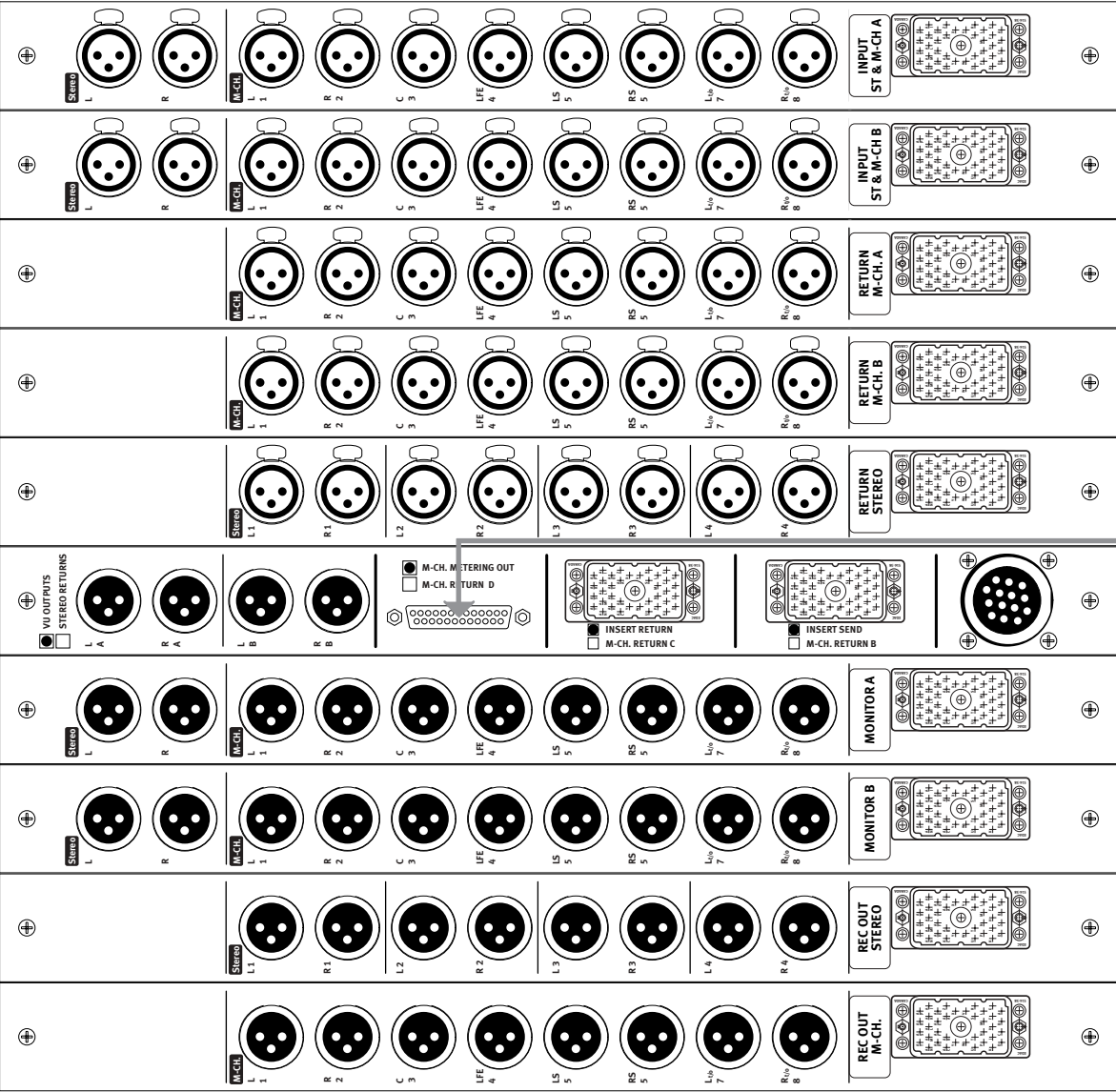put can be activated or deactivated separately with the ON switch, the Fader On switch routes each output to the Master Fader.

Output

Option: Master Bay

```
┌─────────────────────────────────────────┐
│                 MasterBay                │
│                                          │
│  Sequence      Processor       Store/    │
│  Position      Selection       Recall    │
│  ┌───┐        ┌─────────┐    ┌─────────┐ │
│  │ 1 │        │Processor│    │  Store  │ │
│  │   │        │    1    │    │    1    │ │
│  │ 2 │        ├─────────┤    ├─────────┤ │
│  │   │        │Processor│    │  Store  │ │
│  │ 3 │        │    2    │    │    2    │ │
│  │   │        ├─────────┤    ├─────────┤ │
│  │ 4 │        │Processor│    │  Store  │ │
│  │   │        │    3    │    │    3    │ │
│  │ 5 │        ├─────────┤    ├─────────┤ │
│  │   │        │Processor│    │   New   │ │
│  │ 6 │        │    4    │    │         │ │
│  │   │        ├─────────┤    ├─────────┤ │
│  │ 7 │        │Processor│    │  Recall │ │
│  │   │        │    5    │    │    1    │ │
│  │ 8 │        ├─────────┤    ├─────────┤ │
│  └───┘        │Processor│    │  Recall │ │
│               │    6    │    │    2    │ │
│               ├─────────┤    ├─────────┤ │
│               │Processor│    │  Recall │ │
│               │    7    │    │    3    │ │
│               ├─────────┤    ├─────────┤ │
│               │Processor│    │ Bypass  │ │
│               │    8    │    │         │ │
│               └─────────┘    └─────────┘ │
└─────────────────────────────────────────┘
```
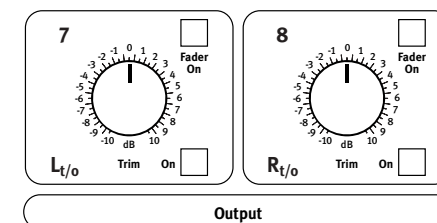
The MMC 2 can optionally be complemented with an automated insert box called MasterBay. The MasterBay consists of an 8U insert box and a remote control panel. Up to eight 8-channel processors can be connected to the insert box, which is operated by the MasterBay remote panel.

With the MasterBay the engineer can specify up to four routings, called sequences, which can be stored and re-called. The remote panel provides a button for each of the eight external processors. Depressing these in sequence switches among choices in processor signal flow. Next to the buttons is a seven segment LED-display indicating the current position of the processors in the sequence.

The mastering engineer can use this feature to compare between sequences in a varying order or to compare the same type of processors—such as in the case of an equalizer from Manufacturer A and one of Manufacturer B. Three memory banks are available which allow an active signal flow sequence to be compared instantly at a push of a button with three others (for a total of four). If the optional MasterBay is connected, the MMC 2's Insert On switch activates the MasterBay or switches it to hard-bypass.

Pin Wiring XLR Inputs
1 = Ground, 2 = hot (+), 3 = cold (-)

Pin Wiring XLR Outputs
1 = Ground, 2 = hot (+), 3 = cold (-)

Please refer to the service documentation for EDAC wiring.

Metering Out Connector

VU metering displays for the channels 1-8 can be connected to the DB25 socket on the rear panel (stereo channels: 1 and 2).

Metering always follows selection: If an input is selected (input trim On switch activated), the trimmed input signal is displayed. The direct input signal (pre input trim) is displayed when a Source Input button flashes (press twice). Select a return to display a return signal.

On channel 1 and 2, the VU Signal is routed also to the XLR pair.

Please note: The display output signals are phase reversed (-180°), this does not matter in metering.

SPL

Measurements

MMC2 Channel 1 Direct,Pre,Insert,Return to Monitor Out

Measures phase difference between Input to DUT and Output from DUT.
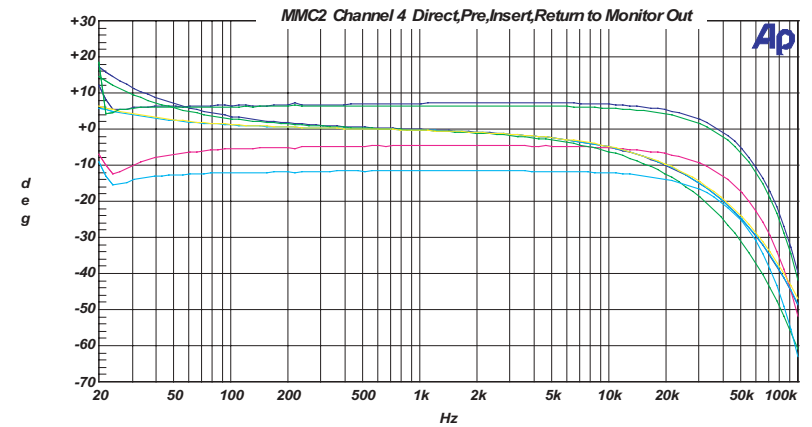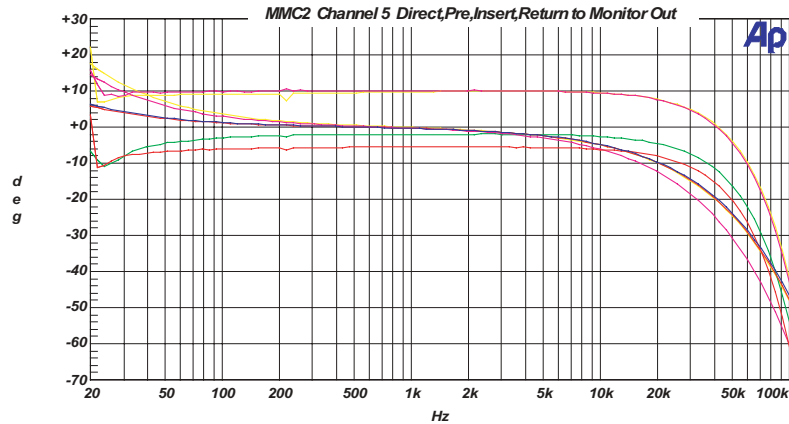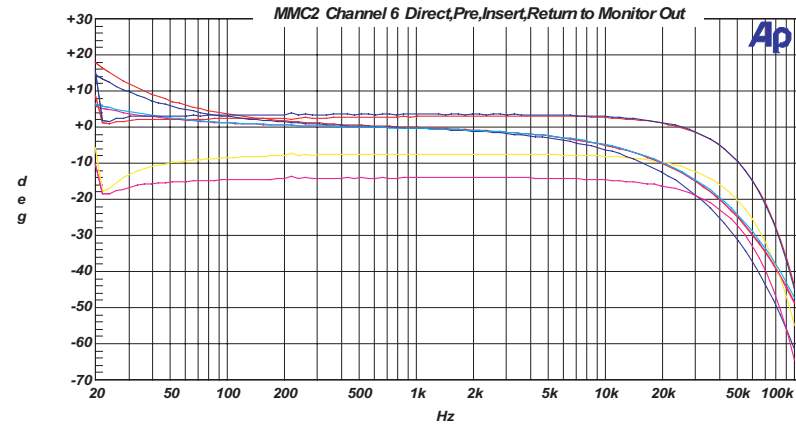Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

MMC2 Channel 2 Direct,Pre,Insert,Return to Monitor Out

Measures phase difference between Input to DUT and Output from DUT.
Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

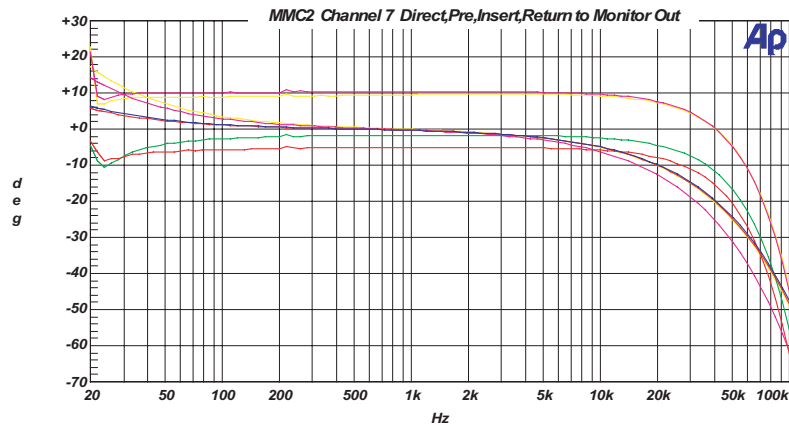**MMC2 Channel 3 Direct,Pre,Insert,Return to Monitor Out**

Measures phase difference between Input to DUT and Output from DUT.
Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

MMC2 Channel 4 Direct,Pre,Insert,Return to Monitor Out

Measures phase difference between Input to DUT and Output from DUT.
Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

Audio Precision   **INPUT/OUTPUT PHASE vs FREQUENCY**   09/20/05 11:50:46

MMC2 Channel 5 Direct,Pre,Insert,Return to Monitor Out

Measures phase difference between Input to DUT and Output from DUT.
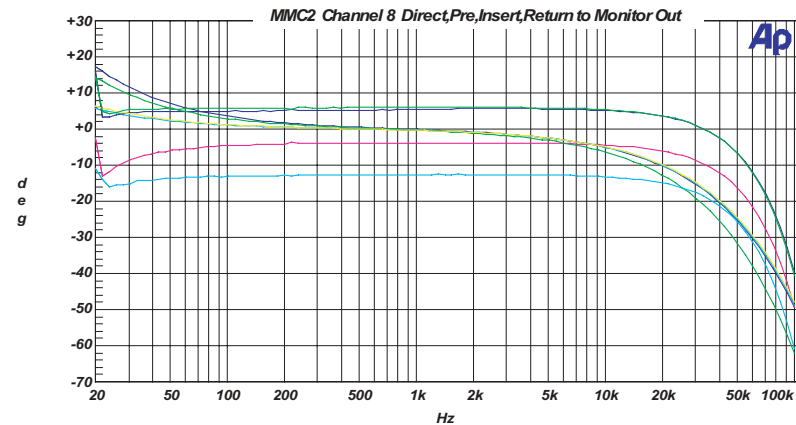Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

Audio Precision   **INPUT/OUTPUT PHASE vs FREQUENCY**   09/20/05 11:54:00

MMC2 Channel 6 Direct,Pre,Insert,Return to Monitor Out

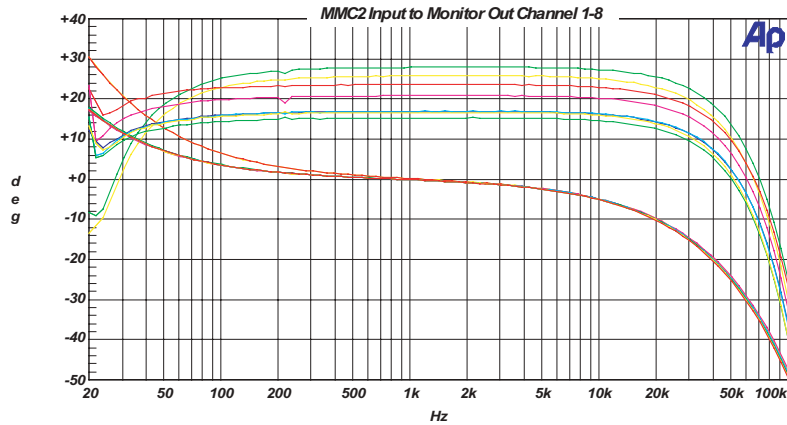
Measures phase difference between Input to DUT and Output from DUT.
Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

Audio Precision   **INPUT/OUTPUT PHASE vs FREQUENCY**   09/20/05 11:56:19

MMC2 Channel 7 Direct,Pre,Insert,Return to Monitor Out

Measures phase difference between Input to DUT and Output from DUT.
Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

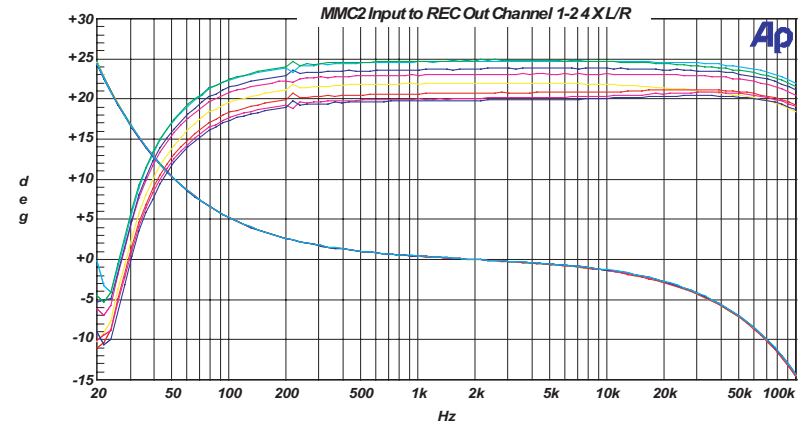**Audio Precision**   **INPUT/OUTPUT PHASE vs FREQUENCY**   09/20/05 11:57:48

MMC2 Channel 8 Direct,Pre,Insert,Return to Monitor Out

Measures phase difference between Input to DUT and Output from DUT.
Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

Measurements

Audio Precision — INPUT/OUTPUT PHASE vs FREQUENCY — 09/20/05 14:40:05

MMC2 Input to Monitor Out Channel 1-8

Measures phase difference between Input to DUT and Output from DUT.
Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

Audio Precision — INPUT/OUTPUT PHASE vs FREQUENCY — 09/20/05 15:10:44

MMC2 Input to REC Out Channel 1-2 4 X L/R

Measures phase difference between Input to DUT and Output from DUT.
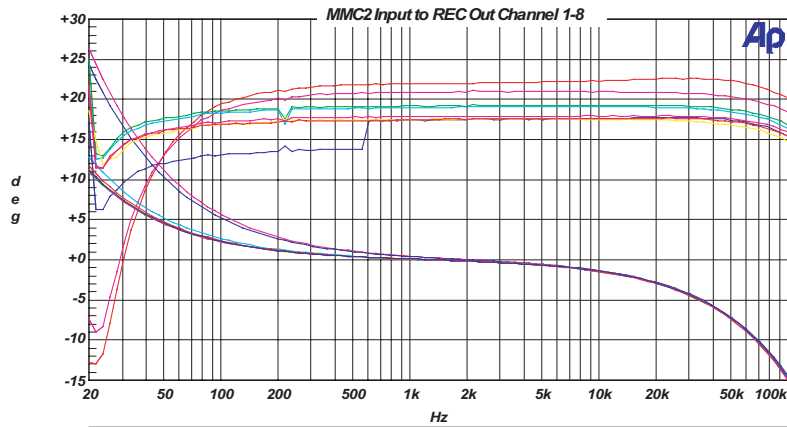Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

Audio Precision — INPUT/OUTPUT PHASE vs FREQUENCY — 09/20/05 15:06:51

MMC2 Input to REC Out Channel 1-8

Measures phase difference between Input to DUT and Output from DUT.
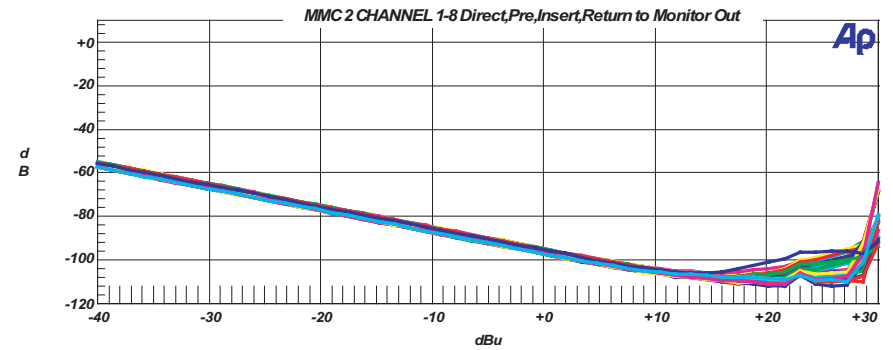Optimize to see the entire range.

SPL IN-OUT PHASE.at2c

Audio Precision — THD+N vs AMPLITUDE — 09/20/05 12:12:45

MMC 2 CHANNEL 1-8 Direct,Pre,Insert,Return to Monitor Out
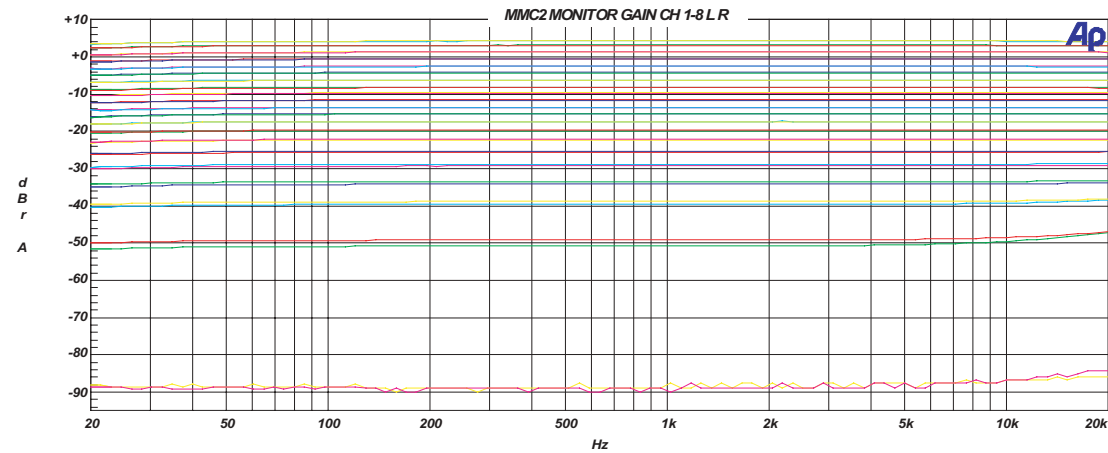
Cyan   : only on
Green   : LF-band
Yellow : LMF-band
Red   : MF-band
Magenta : HMF-band
Blue   : HF-band

THD+N VS AMPL 2CH.at2c

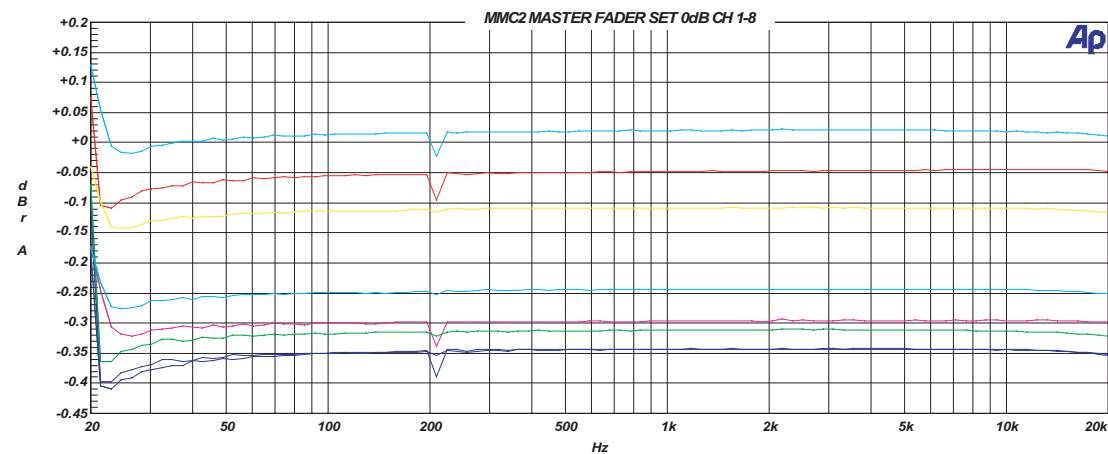*Audio Precision*   **MASTER FADER GAIN - FREQUENCY RESPONSE**   *09/21/05 09:44:19*

MMC2 MONITOR GAIN CH 1-8 L R

*Frequency Response from 20k to 20 Hz. F4 first to set 0 dBr at 1kHz. The 2 Ch Ampl Function Reading meter BW is
set to <10 Hz >500kHz so the bandwidth is the same as the Level meter. Optimize for detail.*

Pegel In-Out.at2c

Audio Precision   **MASTER FADER GAIN - FREQUENCY RESPONSE**   *09/21/05 09:27:55*

MMC2 MASTER FADER SET 0dB CH 1-8

*Frequency Response from 20k to 20 Hz. F4 first to set 0 dBr at 1kHz. The 2 Ch Ampl Function Reading meter BW is
set to <10 Hz >500kHz so the bandwidth is the same as the Level meter. Optimize for detail.*

Pegel In-Out.at2c

Measurements

LFE to LCR cal. to -10dB *09/26/05 15:29:10*

Frequency Response from 20k to 20 Hz. F4 first to set 0 dBr at 1kHz. The 2 Ch Ampl Function Reading meter BW is
set to <10 Hz _>500kHz so the bandwidth is the same as the Level meter. Optimize for detail.

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MASTER FADER GAIN - FREQUENCY RESPONSE *09/21/05 09:35:34*

MMC2 MASTER FADER SET 0,-12,+6 dB CH 1-8

Frequency Response from 20k to 20 Hz. F4 first to set 0 dBr at 1kHz. The 2 Ch Ampl Function Reading meter BW is
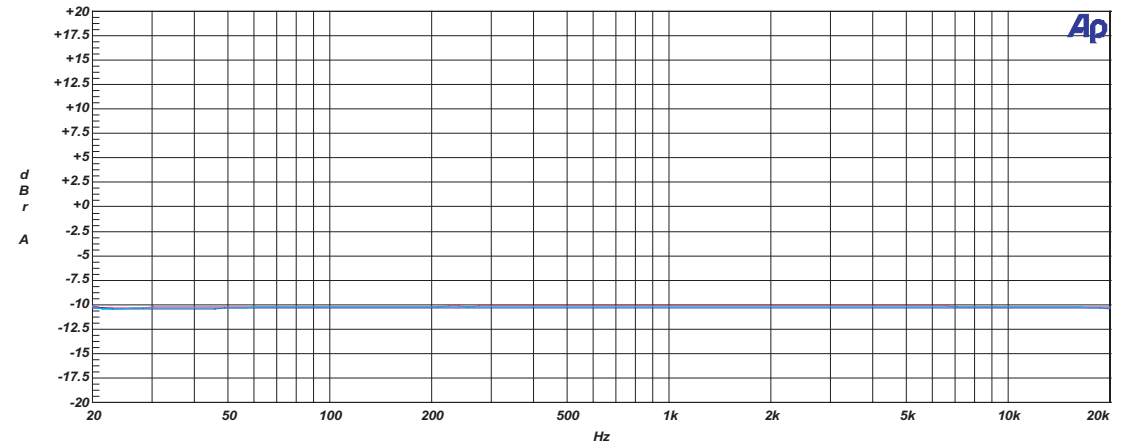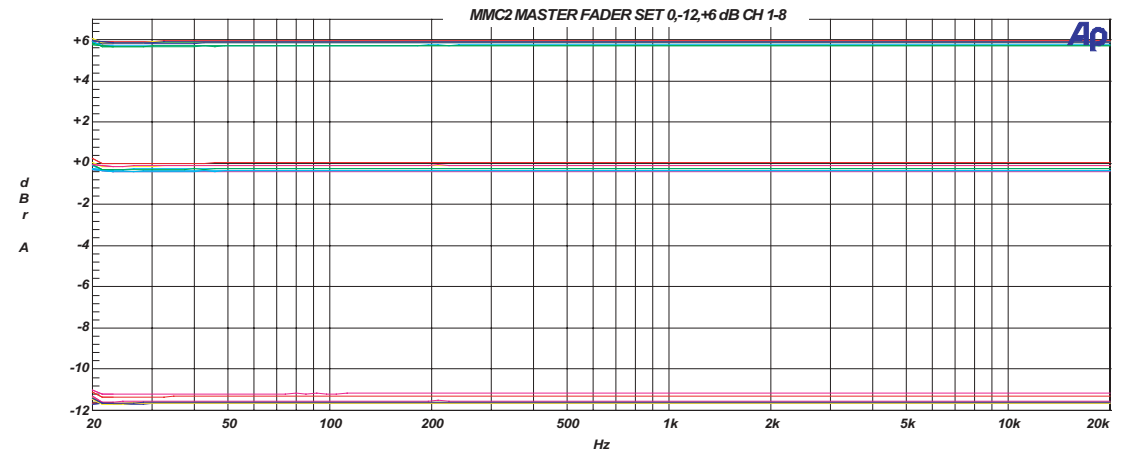set to <10 Hz _>500kHz so the bandwidth is the same as the Level meter. Optimize for detail.

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Audio Precision   GAIN - FREQUENCY RESPONSE   09/21/05 09:19:30

MMC2 PRE TRIM/POT CH 1-8
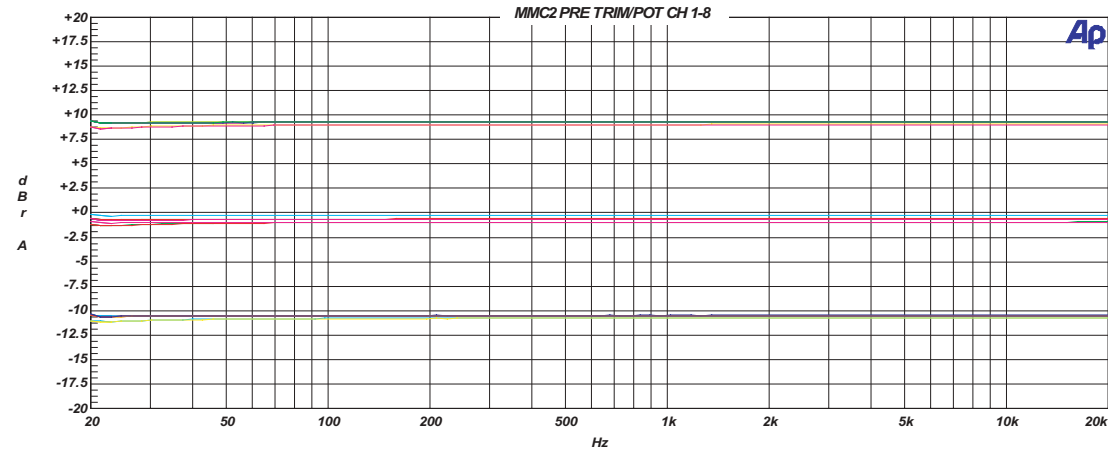
Frequency Response from 20k to 20 Hz. F4 first to set 0 dBr at 1kHz. The 2 Ch Ampl Function Reading meter BW is set to <10 Hz_>500kHz so the bandwidth is the same as the Level meter. Optimize for detail.

Pegel In-Out.at2c

Audio Precision   GAIN - FREQUENCY RESPONSE   09/21/05 09:25:35
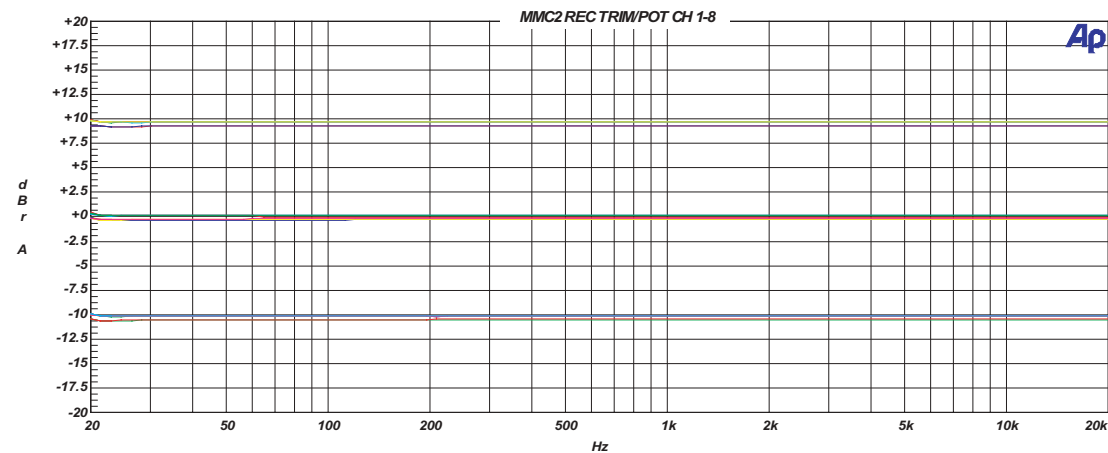
MMC2 REC TRIM/POT CH 1-8

Frequency Response from 20k to 20 Hz. F4 first to set 0 dBr at 1kHz. The 2 Ch Ampl Function Reading meter BW is set to <10 Hz_>500kHz so the bandwidth is the same as the Level meter. Optimize for detail.

Pegel In-Out.at2c

Measurements

MASTER MONITOR GAIN - FREQUENCY RESPONSE   *09/21/05 09:47:00*

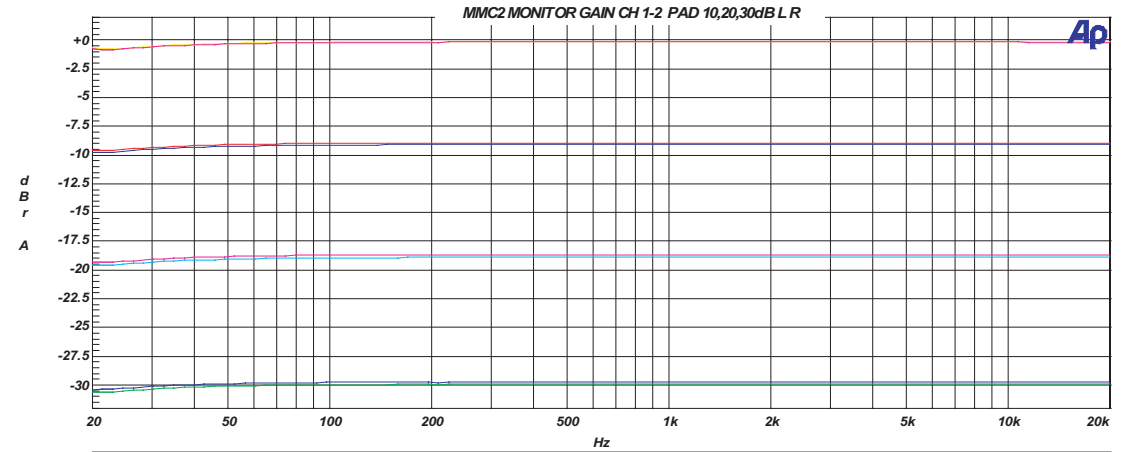**MMC2 MONITOR GAIN CH 1-2 PAD 10,20,30dB L R**

Frequency Response from 20k to 20 Hz. F4 first to set 0 dBr at 1kHz. The 2 Ch Ampl Function Reading meter BW is set to <10 Hz_>500kHz so the bandwidth is the same as the Level meter. Optimize for detail.

Pegel In-Out.at2c

Dynamic Range   ›130 dB

Max. input level   ›30 dBu
(Audio Precision generator limit +30 dBu)

THD & Noise (+24 dBu)
Recording Out: ›110 dBu
Monitor Out: ›108 dBu
Send: ›110 dBu

Input impedance (balanced):   20 kOhm
(Welwyn precision resistors, transformerless)

Output impedance (balanced):   ‹75 Ohm
(CMR trimmers, transformerless)

Dimensions
Front panel   19 inch/11U
Housing incl. connectors (H x W x D)   51.6 x 48.2 x 52 cm/20,3 x 19 x 20.5 inch
Weight   35 kg/77 lb

Power Supply
For optimal audio quality and dramatically reduced inductive disturbance/
interference, the MMC 2's power supply is divided into two parts. The external
part houses a toroidal transformer, the linear power supply is built into the MMC 2
housing.

Input voltage: 110-120 V/60 Hz or 220-240 V/50 Hz

Fuses external transformer: 5 AT (slow)

Fuses internal power supply: +/- 62 Volt PWS 2AT (slow)

Power consumption: 1 A@230 V, 1,6 A@110-120 V

Noise: › -100 dBu (@ +/- 60 V)

Dimensions ext. transformer: Width: 15 cm (5 9/10 inch)
                                                         Depth: 24,5 cm (24 1/2 inch)
                                                         Height: 7 cm (2 3/4 inch)

Weight ext. transformer: 4,2 kg (9,24 lbs)

Warranty

SPL electronics GmbH (SPL) products are warranted only in the country where purchased, through the authorized SPL distributor in that country, against defects in material or workmanship. The specific period of this limited warranty shall be that which is described to the original retail purchaser by the authorized SPL dealer or distributor at the time of purchase.

SPL does not, however, warrant its products against any and all defects:

1) arising out of materials or workmanship not provided or furnished by SPL, or

2) resulting from abnormal use of the product or use in violation of instructions, or

3) in products repaired or serviced by other than authorized SPL repair facilities, or

4) in products with removed or defaced serial numbers, or

5) in components or parts or products expressly warranted by another manufacturer.

SPL agrees, through the applicable authorized distributor, to repair or replace defects covered by this limited warranty with parts or products of original or improved design, at its option in each respect, if the defective product is shipped prior to the end of the warranty period to the designated authorized SPL warranty repair facility in the country where purchased, or to the SPL factory in Germany, in the original packaging or a replacement supplied by SPL, with all transportation costs and full insurance paid each way by the purchaser or owner.

All remedies and the measure of damages are limited to the above services. It is possible that economic loss or injury to person or property may result from the failure of the product; however, even if SPL has been advised of this possibility, this limited warranty does not cover any such consequential or incidental damages. Some states or countries do not allow the limitations or exclusion of incidental or consequential damages, so the above limitation may not apply to you.

Any and all warranties, express or implied, arising by law, course of dealing, course of performance, usage of trade, or otherwise, including but not limited to implied warranties of merchantability and fitness for particular, are limited to a period of 1 (one) year from either the date of manufacture. Some states or countries do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state, country to country.

SPL electronics GmbH, 41372 Niederkruechten, Germany