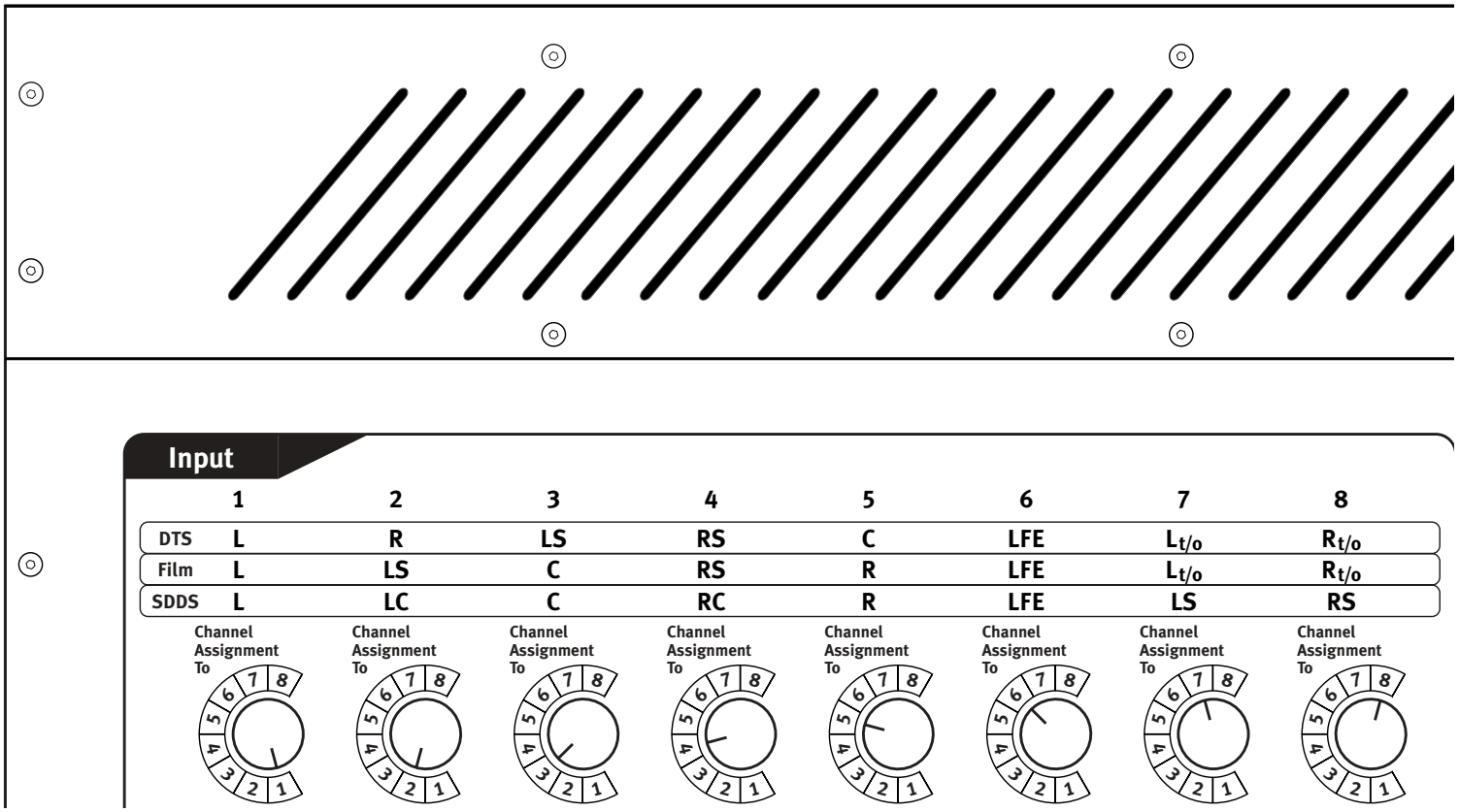
Input
1 2 3 4 5 6 7 8
DTS L R LS RS C LFE Lt/o Rt/o
Film L LS C RS R LFE Lt/o Rt/o
SDDS L LC C RC R LFE LS RS
Channel Assignment To

Manual

Manual, Version 2.0, 5/2004

R & D: Wolfgang Neumann

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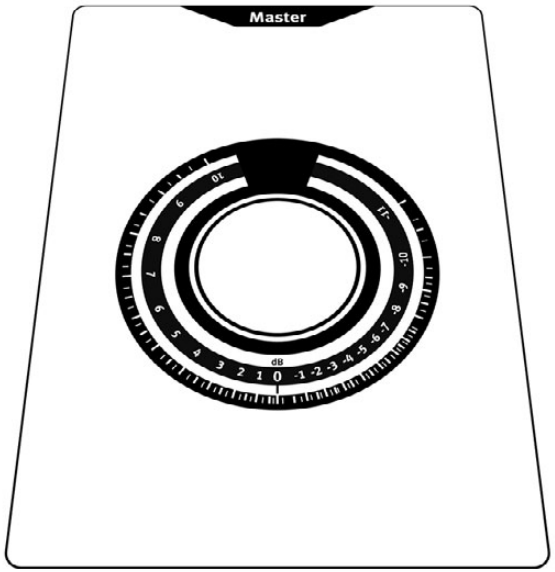


SPL takes pride in being the first audio manufacturer to have developed a multi-channel mastering console that provides a complete spectrum of engineering solutions to multi-channel sources for surround mastering. The purpose of this development was the creation of a console that would be superior in audio quality to all known and foreseeable audio formats, whether analog or digital. Such a console would achieve two important goals of first, an unaltered reproduction in sonic quality of SACD and DVD-Audio, and second, through such quality, of remaining for many years a safe capital investment.

The MMC 1 is conceived as the center of a mastering environment that can fulfill the tasks of speaker management, source connectivity, audio metering, channel assignment, master and monitor level setting and 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. The degree of incompatibility created by the "format war" between PCM and DSD has persuaded us to opt for a technology that is superior in dynamic range, headroom and sound quality to either—or any other—such format. It constitutes discrete analog technology in its most advanced implementation.

Moreover, there are additional prerequisites which speak for the employment of high-performance analog technology:

1. The number of necessary AD/DA conversions should be reduced to a minimum. With the MMC 1, 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.
2. From a purely aesthetic standpoint, high quality analog outboard processing consistently proves itself superior to digital processing. The analog concept allows for problem-free integration of such analog processors.
3. Monitors and power amplifiers are almost exclusively analog in design. Yet another converter at this point in the chain could only degrade the final monitoring quality.

New Technologies

SPL's new SUPRA operation amplifiers are used throughout the MMC 1's design. They perform at an industry benchmark 120 volts and were developed during a four-year period during which SPL searched for a new generation of superior discrete analog op amps. The 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 1 rides comfortably beyond the requirements of either the current maximum 24 Bit/192 kHz PCM format or 1 Bit/256 fs DSD format.

It is simply not realistic to expect at any foreseeable future date, a digital technology environment in which the MMC 1 could become a "bottle neck".

The **Source** section provides for the selection of inputs (4 x stereo/4 x 8-channel) and returns (8 x stereo/8 x 8-channel). The selected input can be monitored at the input or output stage of the console.

The **Input** section itself offers a router for assigning various channel configurations to match the SMPTE channel configuration (which is used throughout the console). Each input channel is equipped with an On, Phase Reverse and a special Trim switch for precise increments in 0.5 dB steps from -9,5 dB to +6 dB.

The **Insert** section is unique. It offers control functions for an automated patchbay, called the "Insert Box". Up to eight, 8-channel processors can be connected to this breakout box. The mastering engineer can store and compare up to four sequences with the push of a button. A global bypass switch (Insert On) activates or deactivates the Insert Box.

The **Master** section is outfitted with an eight-channel Master fader control for dynamic mastering purposes. The Master fader and Monitor Level controls are specially built potentiometers with a tolerance of less the 0.5 dB over their entire range in all 8 levels. This system dispenses with step ladders and proves a quantum leap in dynamic mastering control.

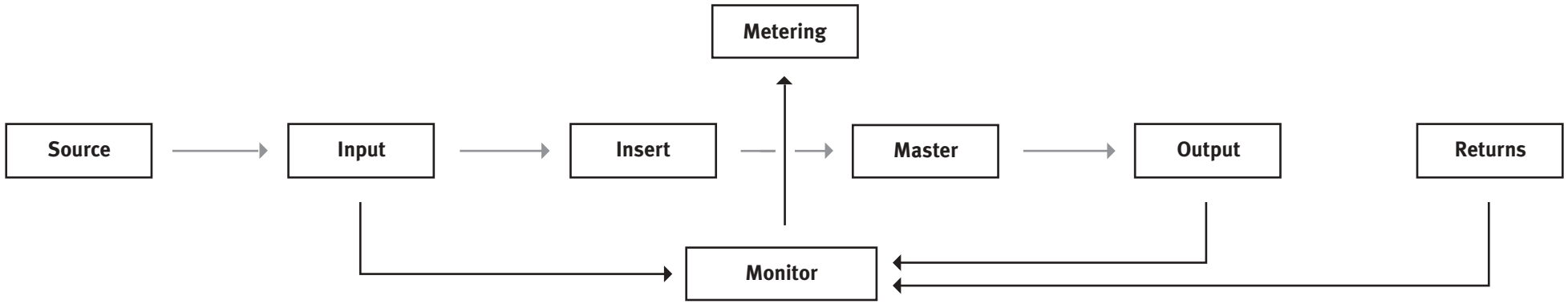
The **Output** section offers the same precision trim controls as the Input section. In each channel, level differences, which may have been introduced by outboard processing, may be compensated for in 0.5 dB steps from -9.5 dB to +6 dB.

The **Monitor** section features a central volume control and buttons for Mute and Dim levels. Two stereo loudspeaker sets and two surround loudspeaker sets of up to eight speakers can be connected to the MMC 1.

There is an On and Solo button for each loudspeaker. The Solo function operates as Solo-in-Place, while a Solo-to-Center switch shunts other channels through the center speaker for better comparison. There is provision to monitor the LFE on the L/C/R. Three Mono functions (L/R, LS/RS, $L_{t/o}$/$R_{t/o}$) and two mode buttons for stereo or multi-channel operation round out the Speaker Management section.

The **Meter Bridge** houses an RTW Surround Monitor 1080ox and eight large VU meters with superb ballistics to display meterings with ultimate precision. The RTW Surround Monitor remote control is built into the console next to the calibration switches for the VUs. VUs may be calibrated to eight different values (0 dB/-2/-4/-6/-8/-10/-12/-14 dB).

Note: Metering always follows monitoring; depending on the selected monitoring signal (input, output or returns), the according metering is displayed automatically.



Parts of box #1:

1. MMC1 mastering console
2. MMC1 meter bridge with built-in RTW Surround Monitor

Parts of box #2:

1. Insert Box
2. Insert Box Remote Control data wire (DB 25)
3. Power supply unit (PSU)
4. IEC power cord
5. Multicord power cable
6. RTW external power supply

Connecting the MMC1

Connect the PSU with multicord power cable to the MMC1. The power connector is placed at the right side of the MMC1 housing.

Above the power connector are two ground connectors (black and yellow). The yellow connector carries the ground from the PSU. It is bridged to the black connector connecting the PSU ground to the MMC1 chassis ground.

If external grounding is required, disconnect the bridge and connect the external ground to the black connector.

IMPORTANT: Using both the external ground and the PSU ground (with the ground bridge still in use) may cause a ground loop resulting in hum.

Mount the MMC1 meter bridge into the custom built frame. This frame is not provided as it is part of the studio design.

Connect the meter bridge to the MMC1 with the four ribbon cables according to the numbers labeled 1 to 4. Make sure that the ribbon cables are connected properly to both sides of the meter bridge. The end of a ribbon cable goes to the left connector/ meter bridge when looking from behind. The connectors only fit in one direction. Do not force the connectors.

Ribbon cable #1: VU Logic – connecting connectors SV8 and SV9.

Ribbon cable #2: In Buss – connecting connectors SV3 and SV4.

Ribbon cable #3: Jumper – preconnected between connectors SV1 and SV2.

Ribbon cable #4: Out/Return Buss – connecting connectors SV6 and SV7.

Ribbon cable #5: Jumper – preconnected between SV5 and RTW.

Ribbon cable #6: RTW Remote – connecting remote modul with RTW.

Connect the external RTW power supply to the RTW Surround Monitor.

Switch on the PSU.

Press Back in the Speaker/Dim section on the control surface of the MMC1 once when powering up the MMC1 for the first time to reset all relays and the TTL logic. Usually this switch is used to release both Dim and Mute switch functions at once.

Connecting Audio

We recommend to use a multi-channel audio player as reference signal.

Connect your audio player to the multi-channel inputs (L/R/C/LFE/LS/RS) of Input A on the rear panel of the MMC1.

Connect the multi-channel monitor set to Monitor A on the rear panel of the MMC1.

Select the M-CH. (multi-channel) operation mode in the Monitor/Speaker Management section on the control surface of the MMC1 to engage full multi-channel capability.

Select Input/M-CH. A in the Source section on the control surface of the MMC1.

The Input section above the Source section features routing switches which are used to assign the source material to the channel configuration of the MMC1. The SMPTE configuration is used throughout the MMC1.

Besides the SMPTE channel configuration, three of the main channel configurations (DTS, Film, SDDS) are listed as a reference in the source section.

In case you have connected the multi-channel inputs in SMPTE order (L/R/C/LFE/LS/RS) you can set the routing switch to 1 for channel one, 2 for channel two ... 6 for channel six (factory preset).

NOTE: Channels 7 and 8 are only used if the source material carries an 8-channel signal (e.g. SDDS).

Press the On switches 1 to 6 to activate the respective channels. Channels 7 and 8 should be activated if the source material carries an 8-channel signal (e.g. SDDS)

Make sure that the Phase Reverse switches are not engaged (factory preset).

In the Input section, set the Trim switches to zero (center) on all channels (factory preset).

In the Output section, set the Trim switches to zero (center) on all channels (factory preset).

Set the Monitor Level control fully counter clockwise. Turn up the Monitor Level later when you have completed the checklist.

Set the Master gain control in the Master section to zero. The Master gain control sets the overall output level of the MMC1 to the recording outs.

Make sure that the Insert On switch in the Insert section is dsabled to maintain the signal flow if the Insert Box is not yet connected.

Activate the monitors by engaging the M-CH A switch in the Speakers/Dim section. Make sure that all Dims and the Mute switch are disabled.

Engage the Speaker switches labelled L, C, R, C, LFE, LS and RS in the Speaker Management section. Make sure that all Solo, Mono and the Solo-to-Center switch are disabled.

Depress the LFE-to-L/C/R switch in case you are operating a 5.0 monitor set up without a sub.

Turn up the Volume control and set the monitoring level. You should now be monitoring the audio player.

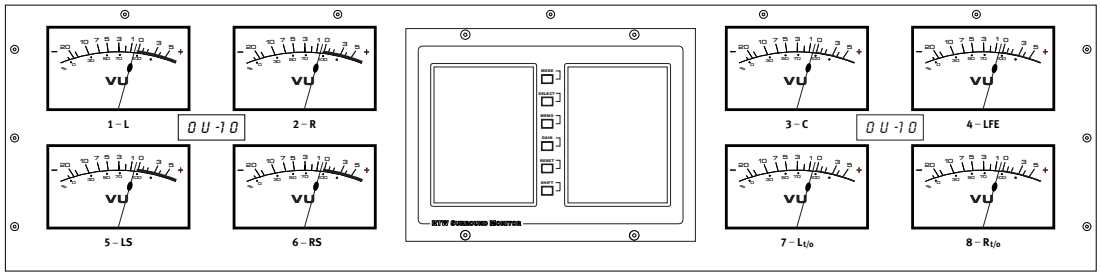
The meter bridge houses a RTW Surround Monitor 1080ox and eight big VU meters with superb ballistics. The remote control for the RTW Surround Monitor is already built into the control surface of the MMC1 next to the calibration switches for the VUs. The metering always follows the selected busses: input, output and return. Please also read the RTW Surround Monitor manual carefully to ensure correct operation.

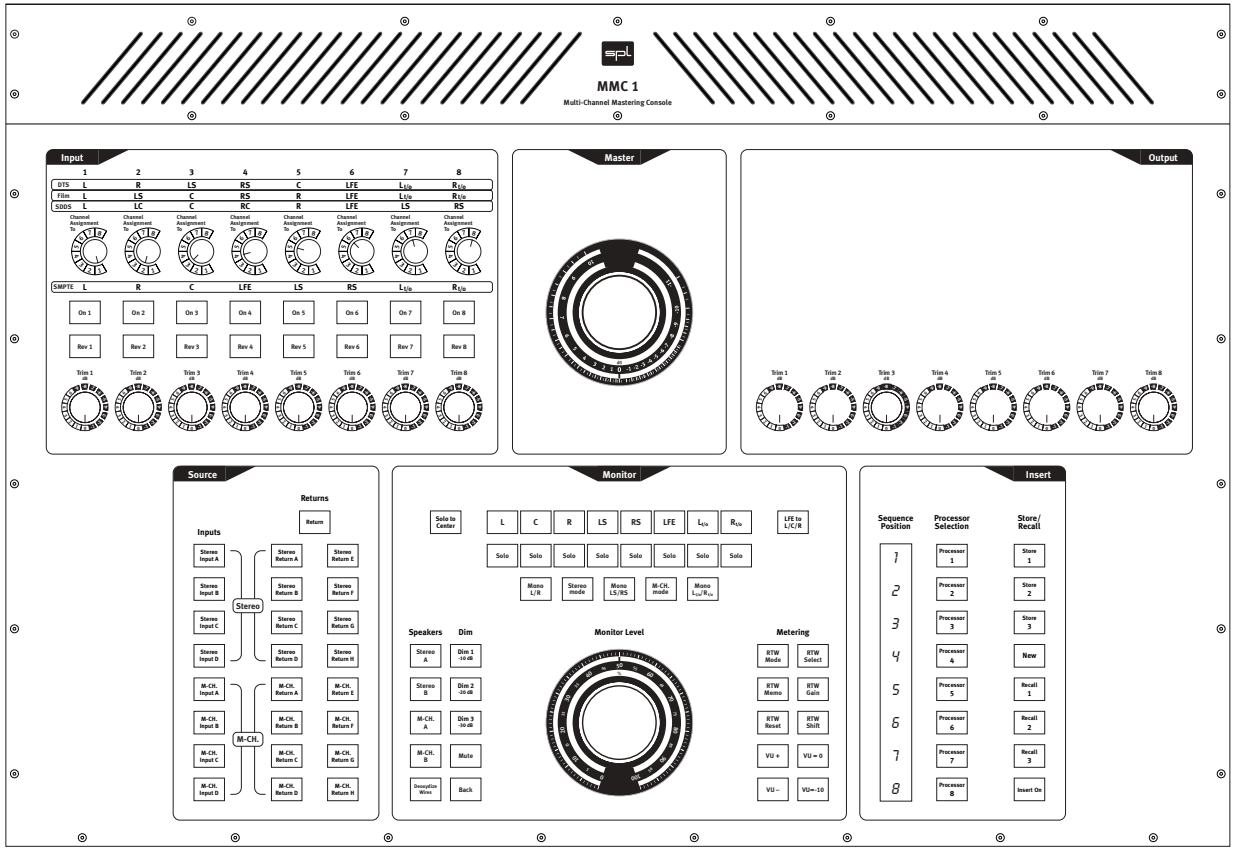
The VUs can be set to eight different 0 dB calibrations (0 dB/-2/-4/-6/-8/-10/-12/-14 dB). To quickly set the VU to 0 dB and –10 dB reference levels two switches labeled VU=0dB and VU=-10dB are provided.

IMPORTANT: The VU's superb ballistics are very sensitive to room temperature. The default calibration is adjusted to 18 °C room temperature. Only a few degrees difference in room temperature cause deviations.

Calibration to room temperatures can be made after the MMC1 has reached operating temperature. If re-calibration is necessary, open the meter bridge housing and adjust the trimmers on the PCB labeled with GAIN (see graphic on page 32). With a +4 dBu input level, the VU must indicate a 0 dB level.

Control Surface





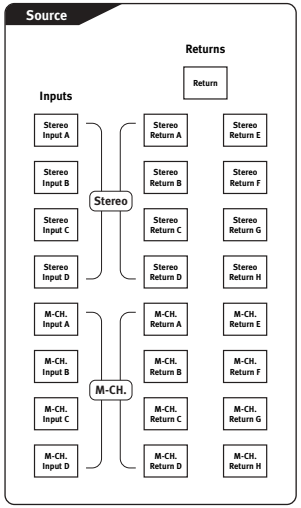
Source

The Source section is subdivided into two parts. At the left are the input selectors, which are fed to the mastering path. Here the MMC 1 can accept four stereo inputs and four 8-channel inputs. The Return button allows to switch between the selected input (four stereo/four multi-channel) and the selected return (eight stereo/eight multichannel). The returns consist of selection options for returns from recorders, DAW, analog multi-tracks, SACD and DVD-Players, TV, AC3/DTS encoder/decoder, and so on. The return inputs from the rear Stereo Return A slot are provided by the Stereo Return buttons A-D, the returns from the rear Stereo Return B slot are provided by the Stereo Return buttons E-H.

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 before the input trim is monitored. This way, you can easily compare what comes in and what goes out of the console.

IMPORTANT: Selecting the input monitoring mode (input button flashes) overrules the Return mode.

NOTE: All MMC 1 buttons allow for individual labelling.



Input

Signals selected in the Source section are routed to the Input section. A passive routing switch, which can route individual channels to any other channel—a function that is essential to achieving the differing channel configurations of surround formats.

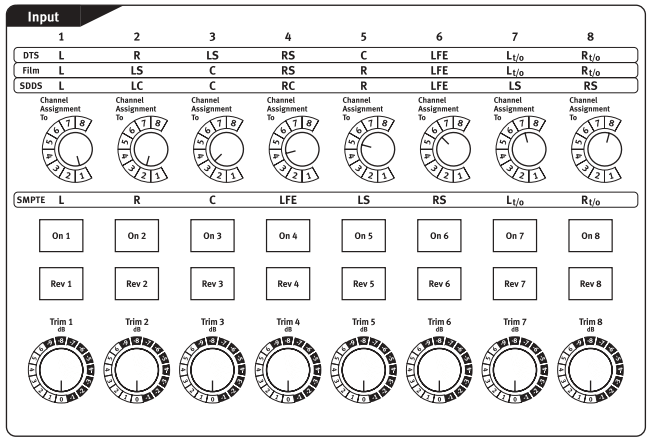
A table gives an overview of the most important channel configurations:

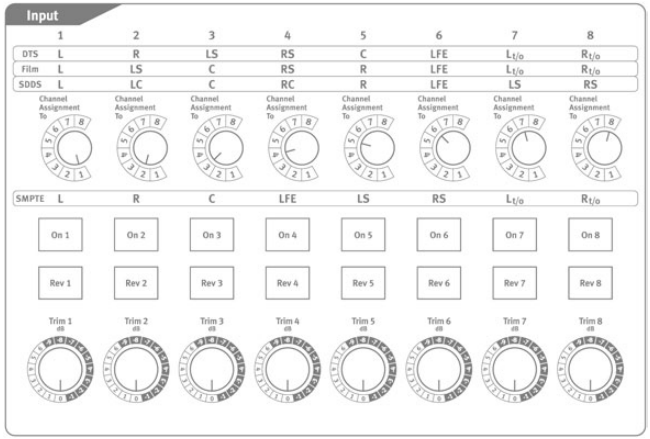
DTS: L / R / LS / RS / C / LFE / $L_{t/o}$ / $R_{t/o}$
Film: L / LS / C / RS / R / LFE / $L_{t/o}$ / $R_{t/o}$
SDDS: L / LC / C / RC / R / LFE / LS / RS

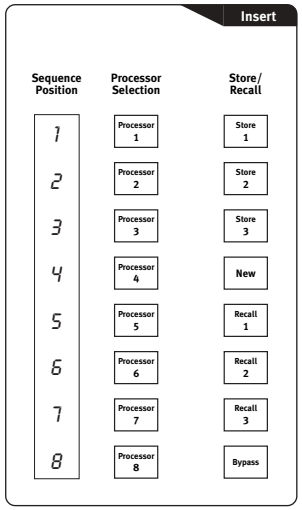
The MMC 1 buss structure follows SMPTE/ITU channel configurations:

SMPTE: L / R / C / LF / E / LS / RS / $L_{t/o}$ / $R_{t/o}$

Note: $L_{t/o}$ and $R_{t/o}$ explained: The appendix “t” means “total” and refers to the automatic stereo downmix function within AC3-encoders, whereas the appendix “o” means “only” and stands for a separate stereo mix.







Page 9 continued: The routing selector translates any possible channel configurations into the SMPTE configuration. The high-quality switch has gold-plated silver contacts with a life span of over 25,000 switching cycles.

The audio signal continues through an On and a Phase Reverse switch, followed by the 32-position Trim switch. The trimming range is -9.5 dB to +6 dB scaled in 0.5 dB steps.

The specialty of this switch is its mechanical architecture that involves only two contacts at a time. Common switches route the audio through a chain of resistors in series. Thermal noise and tolerances add up. The MMC 1 Trim switch avoids this by routing the audio through only one 0,1% metal film resistor at any of its 32 positions.

Insert

While it is relatively easy in a stereo environment to connect processors via a patchbay and specify their position in the audio path, this task is much more complicated and time consuming when dealing with surround. To help alleviate this complexity, the MMC 1 features an Insert Box to which up to eight 8-channel processors can be connected. The unique advantage of MMC 1 is that the engineer can specify up to three routings, called “sequences”, which can be stored and re-called.

The Insert section provides a button for each of the eight external processors. The order in which the processor selection buttons are activated determines the processor sequence. A seven segment LED-display next to each button indicates the current position of a processor. The mastering engineer can use this feature to compare between sequences in 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 button push with three others (for a total of four). An Insert On switch engages the Insert Box or switches to hard-bypass.

Storing a processor sequence

1. Press New

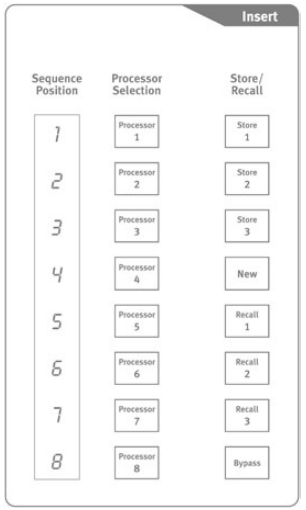
2. Select processor sequence

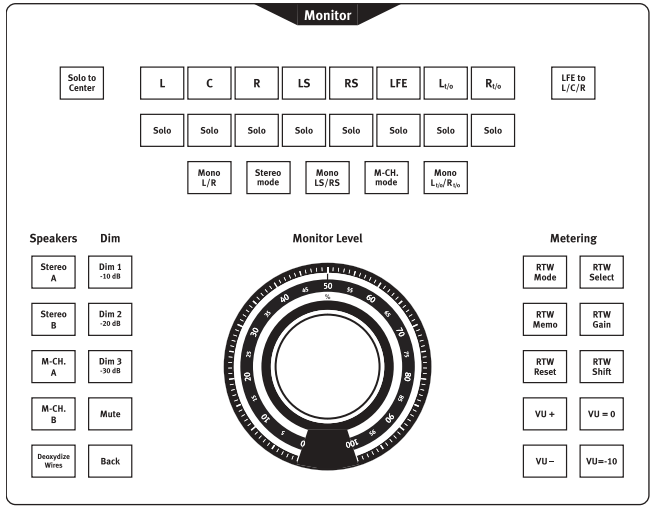
3. Press Store 1, Store 2 or Store 3

To recall a stored processor sequence, press the respective Recall button.

To exclude one or more processors from a stored preset, press the according Processor Selection button (illumination off). The processor is hard-bypassed. It can be switched into the signal path at the former position by pressing the Processor Selection button again (illumination on).

NOTE: When working with a sequence that has not been stored previously, a processor can not be taken out of the sequence like described above, but you can add processors to the selection. When working with a previously stored sequence, you can not add further processors to this selection.





Monitor Section

The Monitor section is divided into four sub sections: Speaker Management, Speakers/Dim, Monitor Level, Metering/RTW Surround Monitor & VUs.

1. Speaker Management

   Each loudspeaker is controlled by an On switch, and each is shown with its respective loudspeaker position. Underneath each control is a Solo function. To improve comparing channels, a Solo-to-Center function allows for monitoring of each channel through the center speaker. NOTE: The Solo-to-Center function can only be activated if a speaker is previously switched to solo. In cases where a surround sound mix does not have separate LFE subwoofers, the LFE-to-L/C/R switch distributes an LFE signal (at -18 dB level) to L/C/R channels.

   Two Operation Mode buttons are provided to change the MMC 1 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 Lt/o / Rt/o (not available in stereo mode).

2. Speakers/Dim

   Three different Dim levels (-10 dB, -20 dB, -30 dB) can be selected with the respective buttons. An additional Mute function and Back switch are provided so that when Mute is activated while a Dim function is on, the Back switch can alone quickly restore prior monitor level settings. Two stereo pairs and two surround loudspeaker sets can be connected for monitoring the MMC 1's output. Two speaker sets can be used in parallel for simultaneous monitoring. NOTE: When operating two speaker sets simultaneously, the speaker's/amplifier's input impedance must be above 10kOhm to avoid level decreases.

3. Monitor Level

   The global Monitor Level is regulated with a custom-made eight-tiered potentiometer. The MMC 1 does not use DACs, step ladders or VCAs for this function, and the specifications of this potentiometer are substantially better than either of these other options normally could be. The maximum tolerance is 0,5 dB over the entire control range.

Because such an engineering masterpiece deserves an appropriate optical and functional presence, this control sports a massive, 60 mm diameter aluminum knob. The scaling is illuminated with 30 blue LEDs on a circular area of 120 mm with a pointer element from miniature orange LEDs.

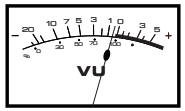
4. Metering/RTW Surround Monitor & VUs

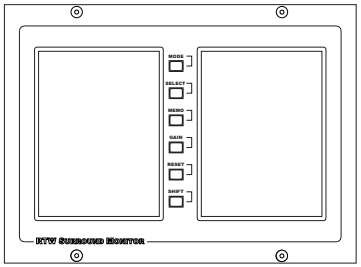
   To the right of the Monitor Level potentiometer are the switch functions for the VUs and the RTW Surround Monitor. All functions of the RTW can be controlled remotely. They are placed next to the Monitor Control potentiometer for easy access, and thus the mastering engineer does not need to leave his chosen optimal listening position.

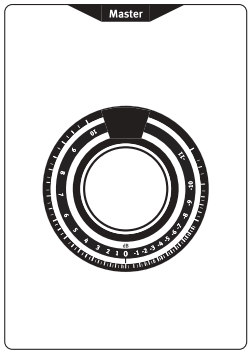
   Please refer to the enclosed RTW manual for further information.

   The VUs are likewise custom-made by Yamaki from Japan which manufacture VUs with optimal ballistic characteristics. The VUs can be calibrated at eight different reference levels (0 dB/-2/-4/-6/-8/-10/-12/-14 dB), displayed by two seven segment LED displays. Two dedicated buttons can be used to quickly calibrate the VUs to 0 dB or -10 dB.

   The metering always follows the selected signal: Input is displayed as IN, output is displayed as OU and return is shown as RT by the seven segment LED displays.





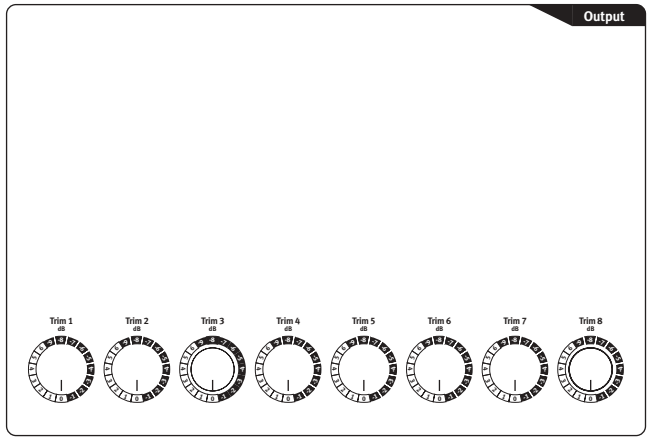


Master Fader

The MMC 1 provides three, eight channel and four dual channel global recording outputs. This fader features the same level control potentiometer as in the Monitor Level section. With this control's extremely fine level settings, the engineer can attain every ounce of recording headroom. The result, thanks to these controls of practically infinite resolution, is an unparalleled excellence in dynamic mastering.

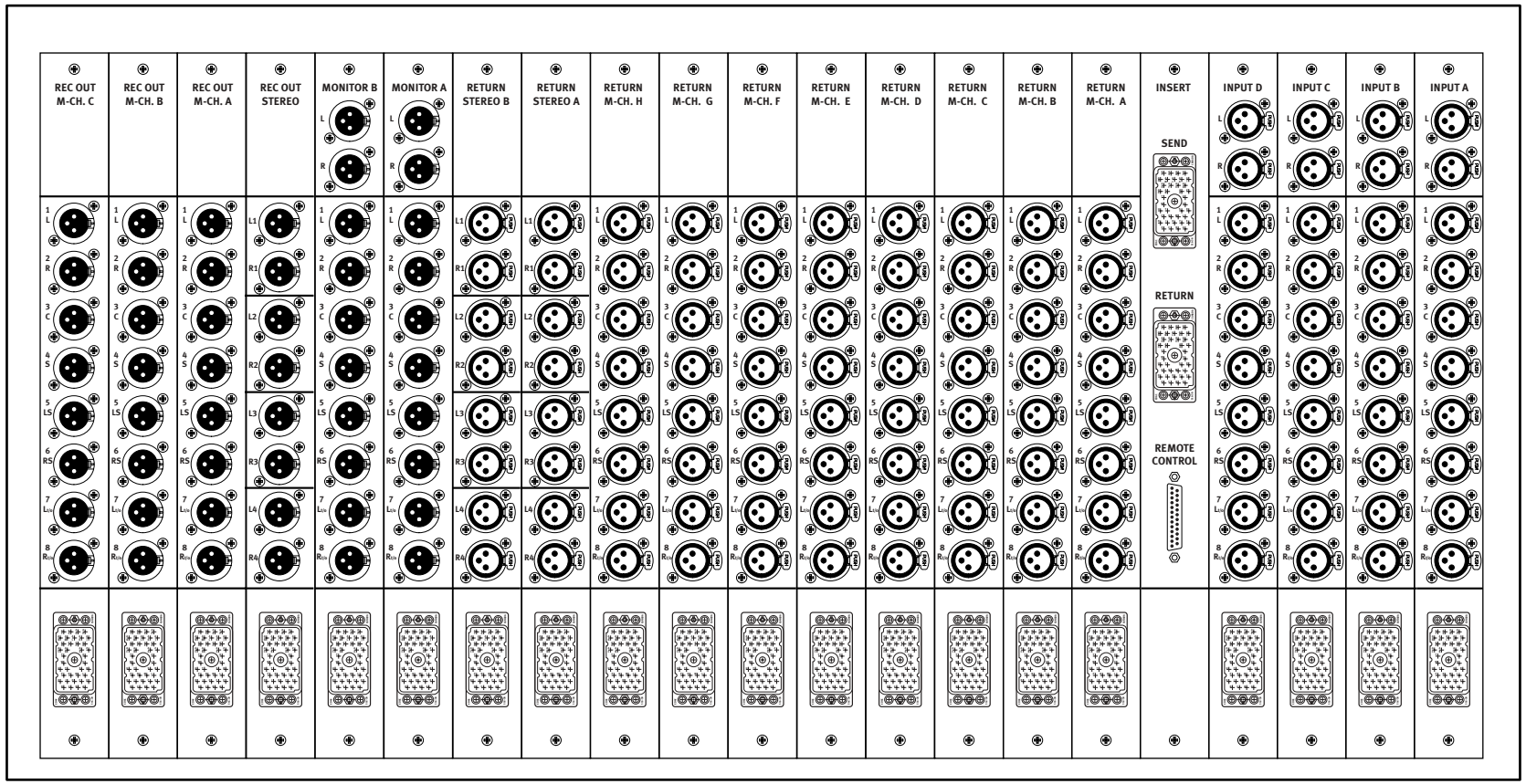
Output

The MMC 1's reverse provides three parallel 8-channel and four parallel dual channel recording outputs. For each channel, there is the same 32-step, 0.5 dB trim control as in the Input section, e g. to compensate for level differences arising from processing signals through the insert box.

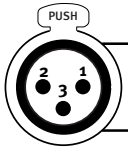


Rear Panel/Connections

The MMC 1 provides both balanced XLR an EDAC input and output sockets, working in parallel.

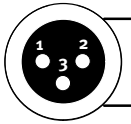


XLR I/Os



Pin Wiring XLR Inputs

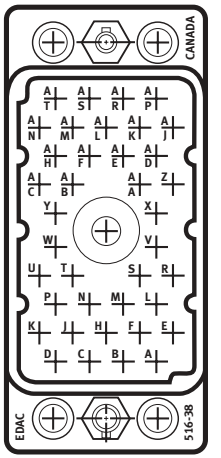
1 = Ground, 2 = hot (+), 3 = cold (-)



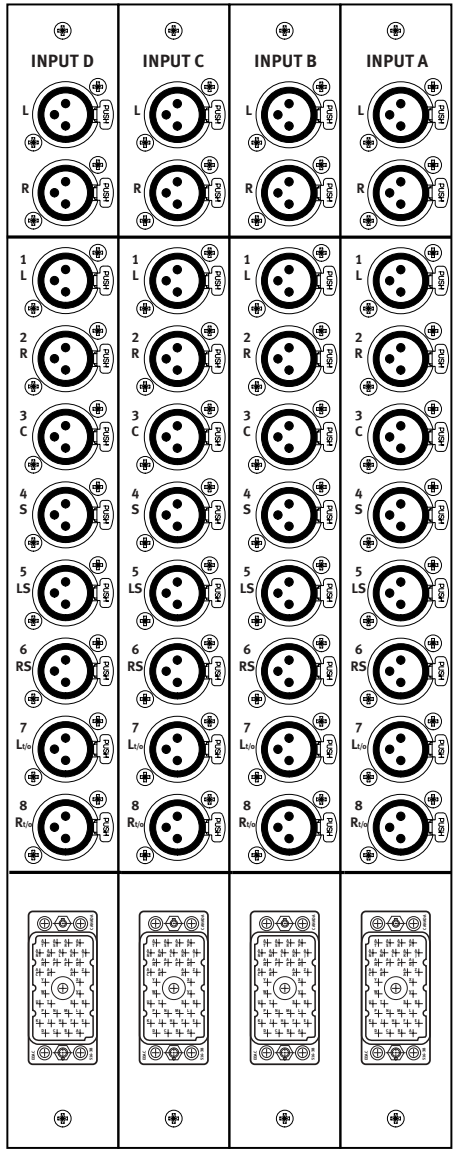
Pin Wiring XLR Outputs

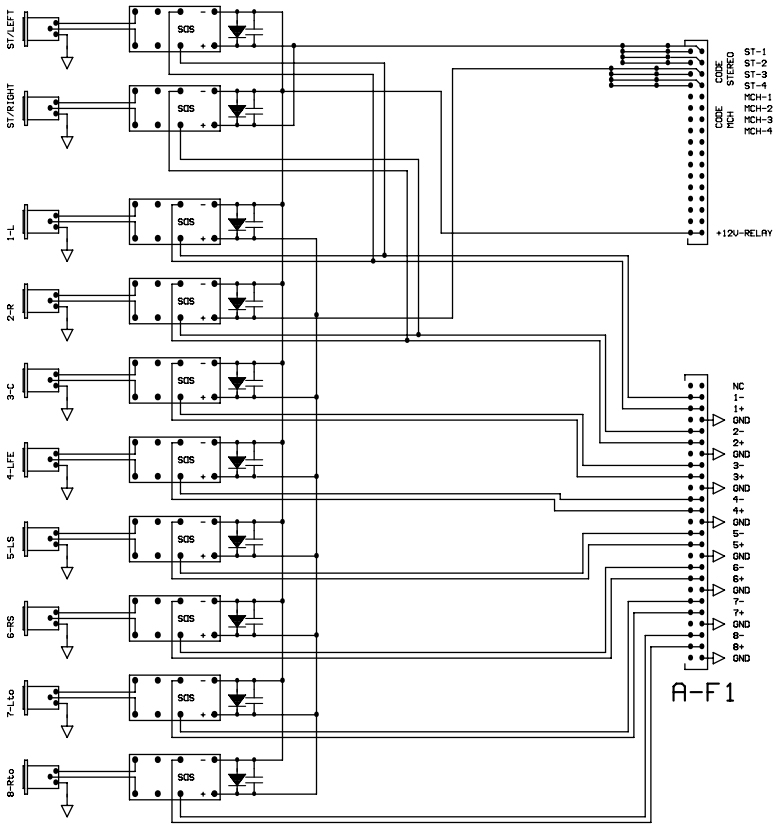
1 = Ground, 2 = hot (+), 3 = cold (-)

EDAC 38 Pin I/Os

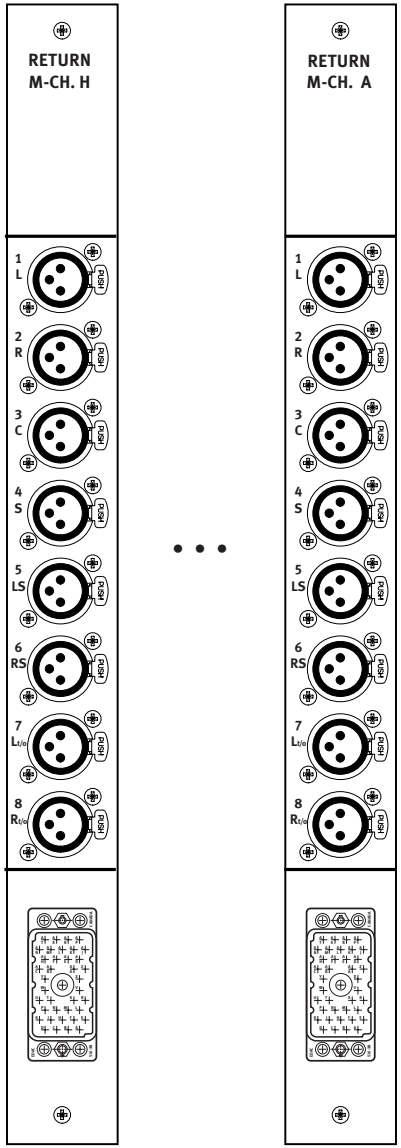


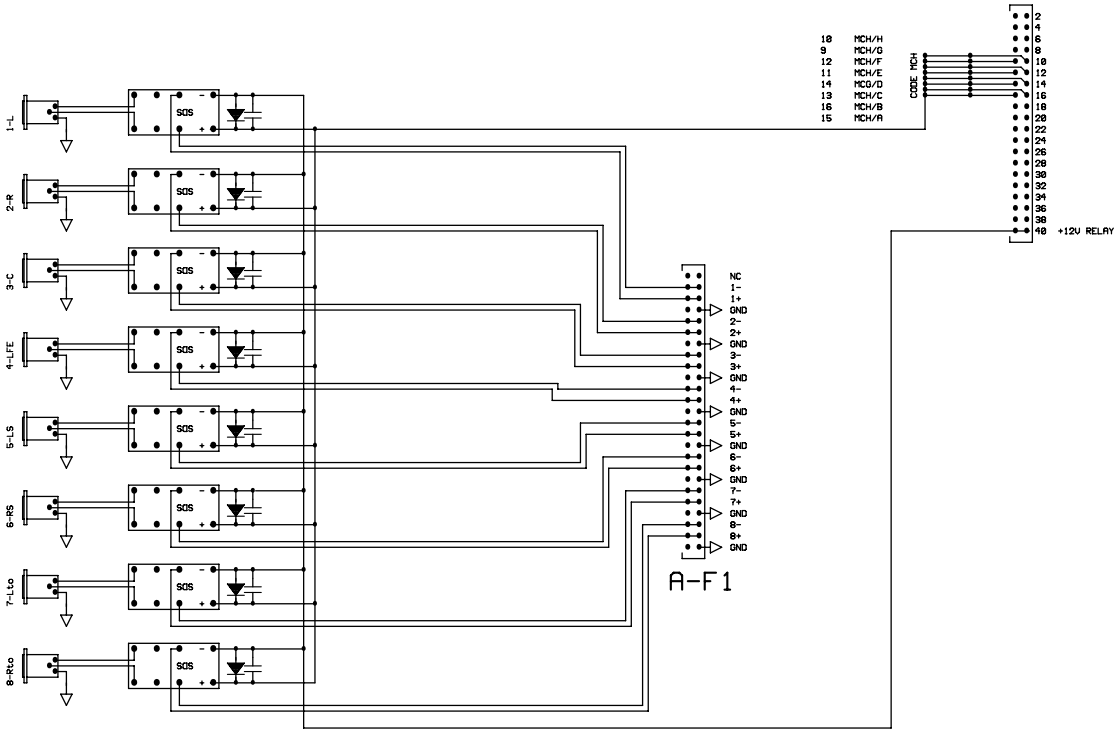
	H (+)	L (-)	GND (⊥)
CH. 1	AP/PP	AJ/JJ	AK/KK
CH. 2	AL/LL	AR/BR	AS/SS
CH. 3	AT/TT	AM/MM	AN/NN
CH. 4	AC/CC	AH/HH	Y
CH. 5	U	W	T
CH. 6	J	D	K
CH. 7	B	H	C
CH. 8	E	A	F
Stereo left	AP/PP	AJ/JJ	AK/KK
Stereo right	AL/LL	AR/BR	AS/SS

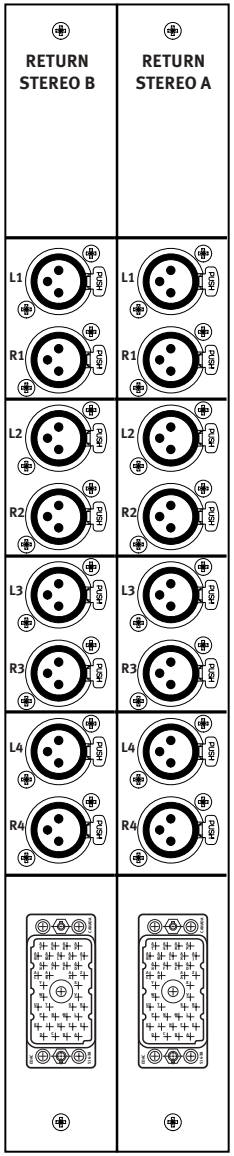

INPUT D
INPUT C
INPUT B
INPUT A
L
R
1 L
2 R
3 C
4 S
5 LS
6 RS
7 Lt/o
8 Rt/o

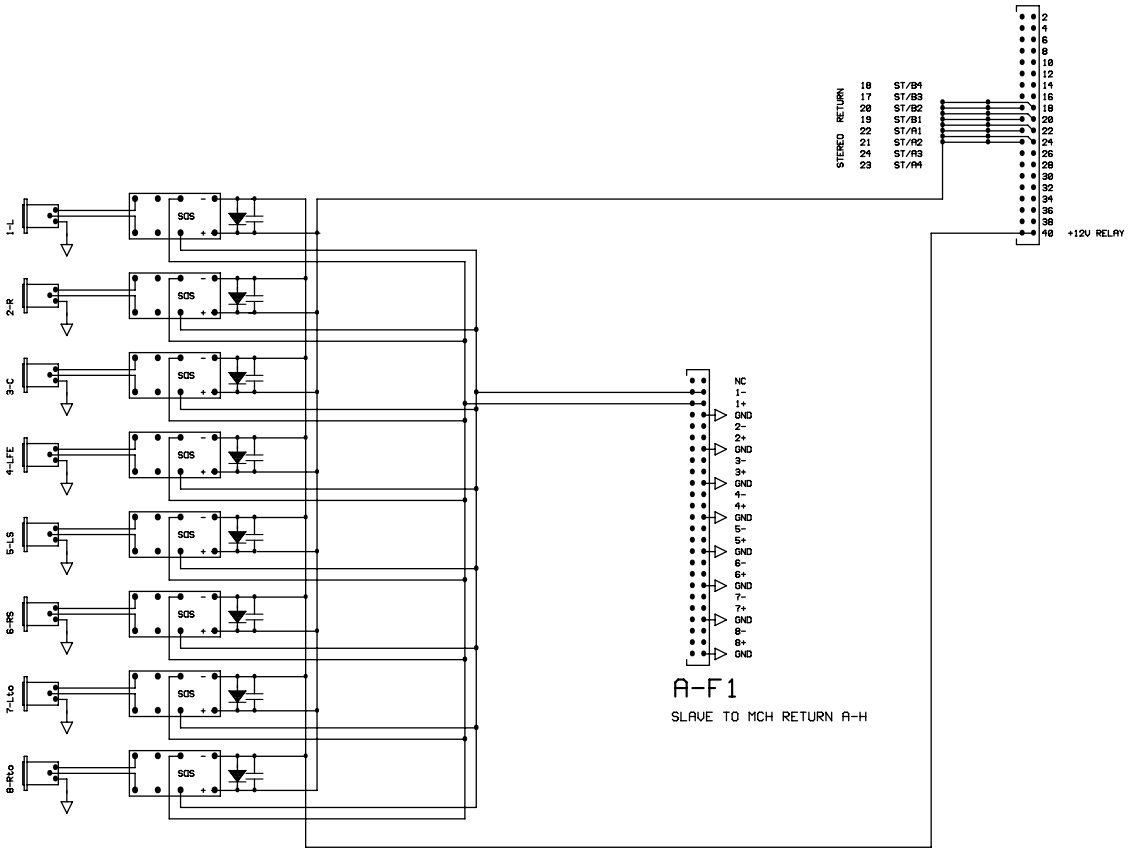

ST/LEFT
ST/RIGHT
1-L
2-R
3-C
4-LFE
5-LS
6-RS
7-Lto
8-Rto
SOS
CODE STEREO
ST-1
ST-2
ST-3
ST-4
CODE MCH
MCH-1
MCH-2
MCH-3
MCH-4
+12V-RELAY
NC
1-
1+
GND
2-
2+
GND
3-
3+
GND
4-
4+
GND
5-
5+
GND
6-
6+
GND
7-
7+
GND
8-
8+
GND
A-F1

Multi-channel Returns

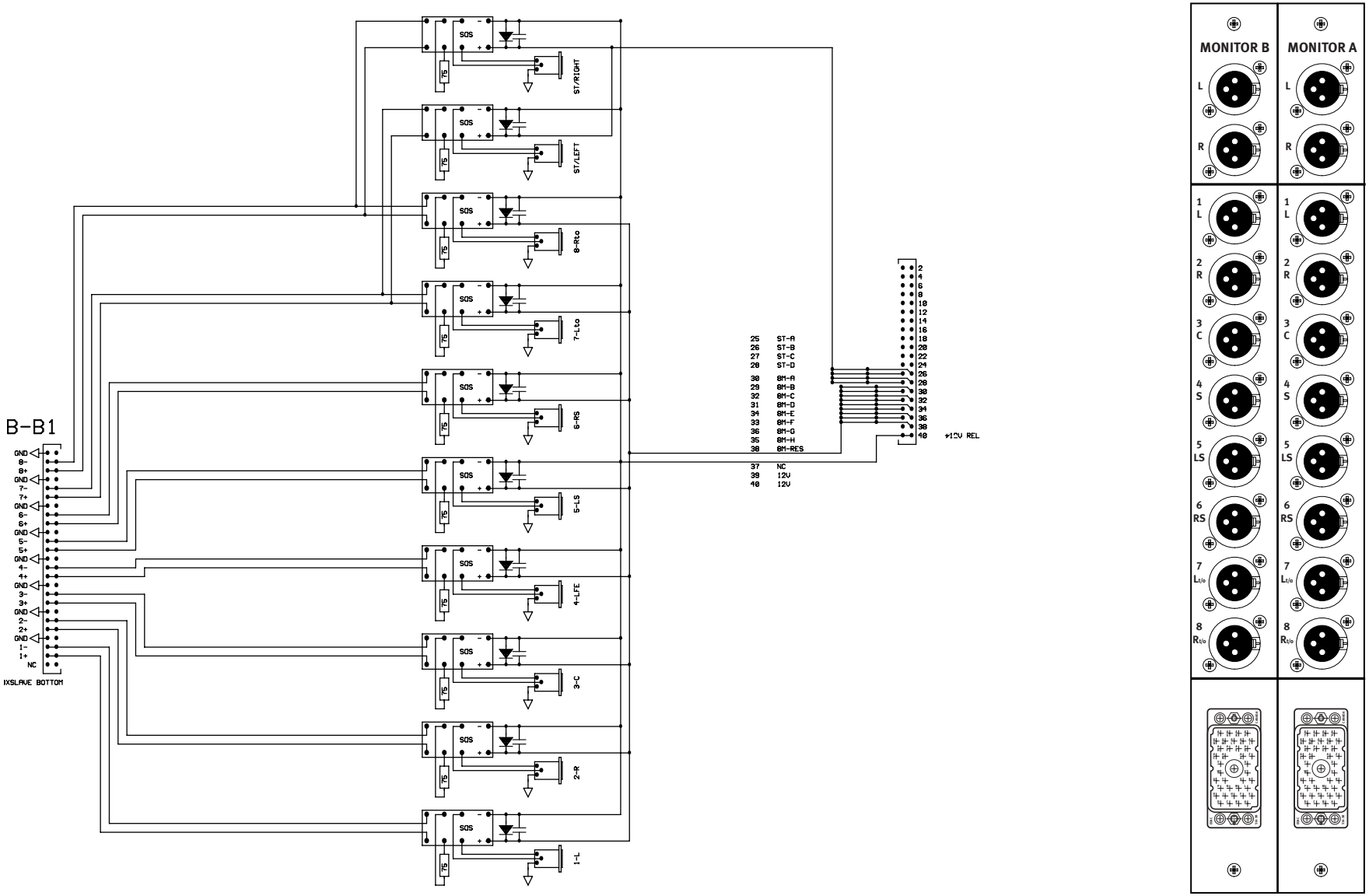


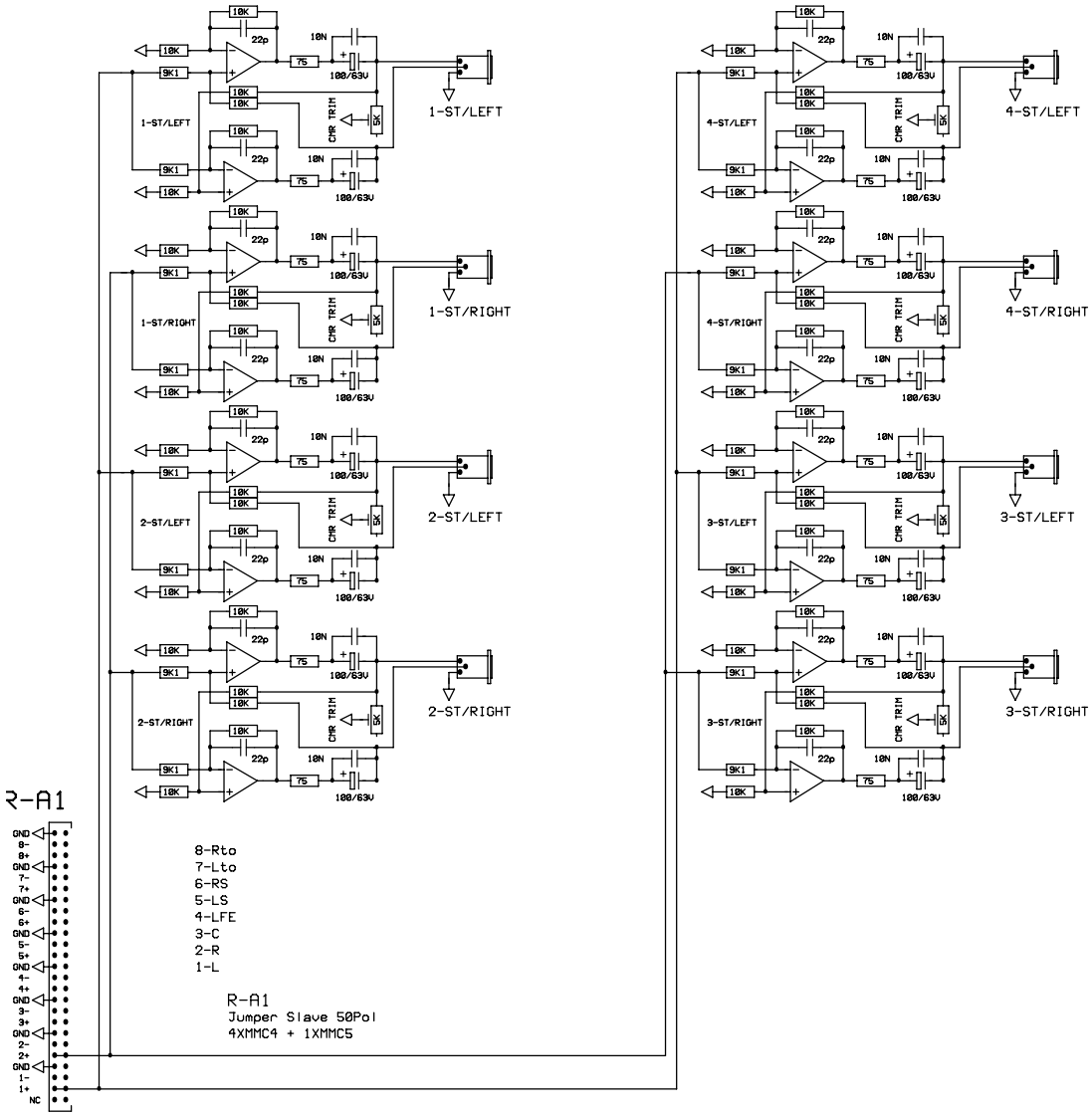


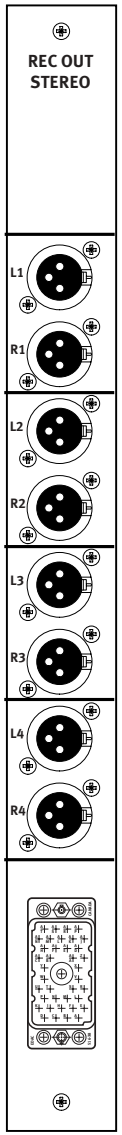

RETURN
STEREO B
RETURN
STEREO A
L1
R1
L2
R2
L3
R3
L4
R4


STEREO RETURN
18 ST/B4
17 ST/B3
20 ST/B2
19 ST/B1
22 ST/A1
21 ST/A2
24 ST/A3
23 ST/A4
40 +12V RELAY
1-L
2-R
3-C
4-LFE
5-LS
6-RS
7-LSb
8-RSb
SOS
NC
1-
1+
GND
2-
2+
3-
3+
4-
4+
5-
5+
6-
6+
7-
7+
8-
8+
A-F1
SLAVE TO MCH RETURN A-H

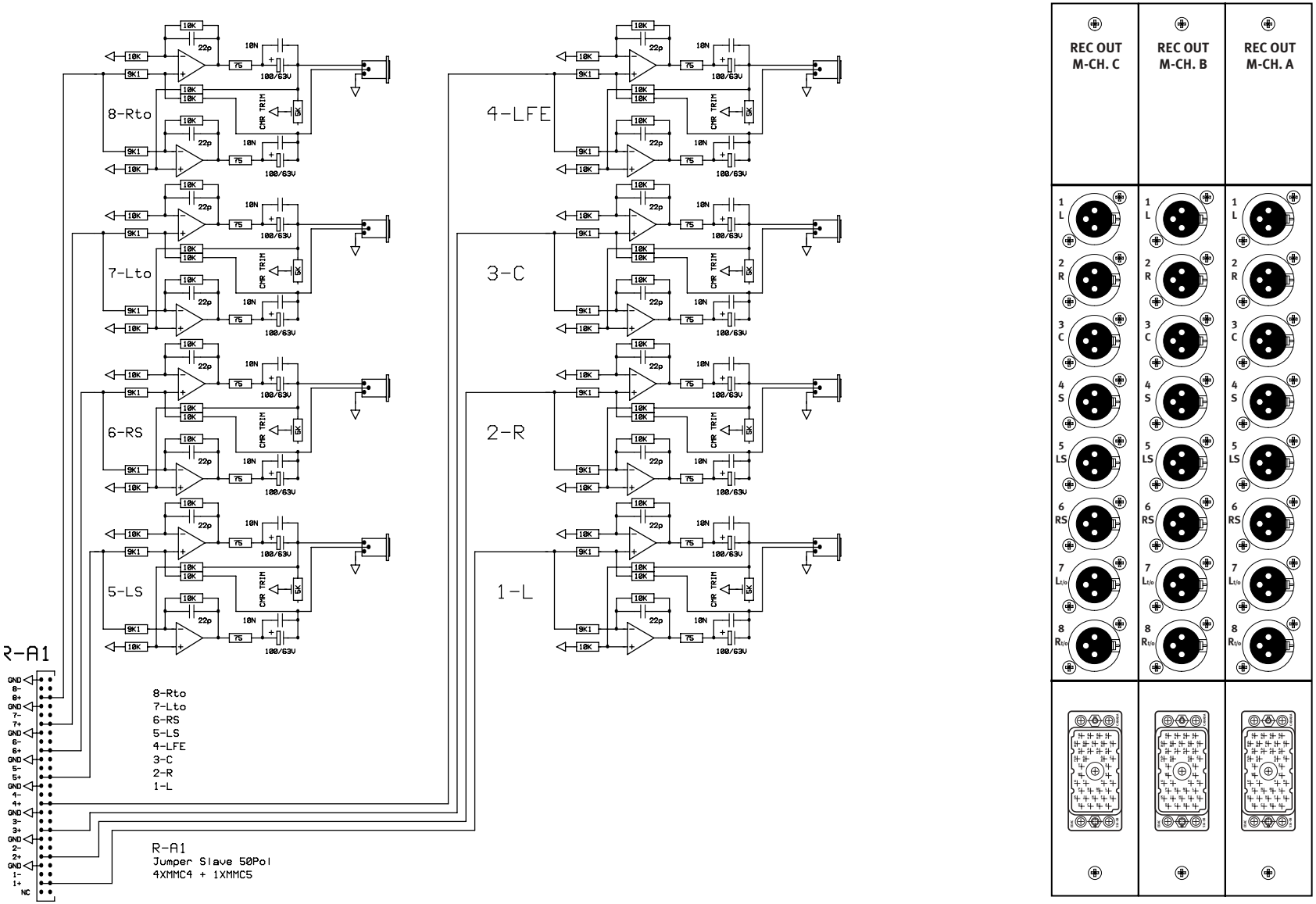
Monitor Outputs

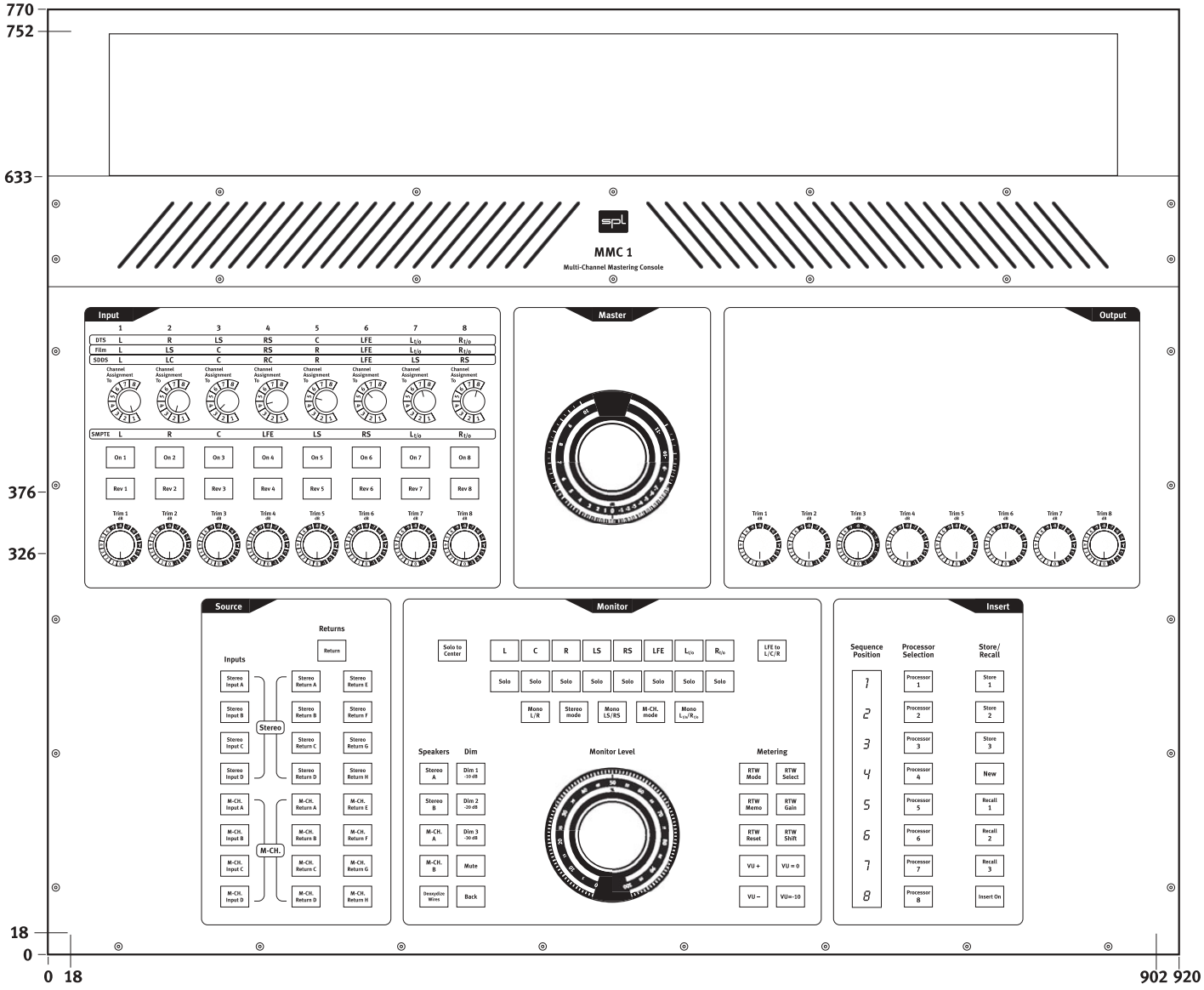



R-A1
GND
8-
8+
GND
7-
7+
GND
6-
6+
GND
5-
5+
GND
4-
4+
GND
3-
3+
GND
2-
2+
GND
1-
1+
NC
8-Rto
7-Lto
6-RS
5-LS
4-LFE
3-C
2-R
1-L
R-A1
Jumper Slave 50Pol
4XMMC4 + 1XMMC5
1-ST/LEFT
1-ST/RIGHT
2-ST/LEFT
2-ST/RIGHT
4-ST/LEFT
4-ST/RIGHT
3-ST/LEFT
3-ST/RIGHT
CHR TRIM
10K
9K1
22p
10N
75
100/63V
5K

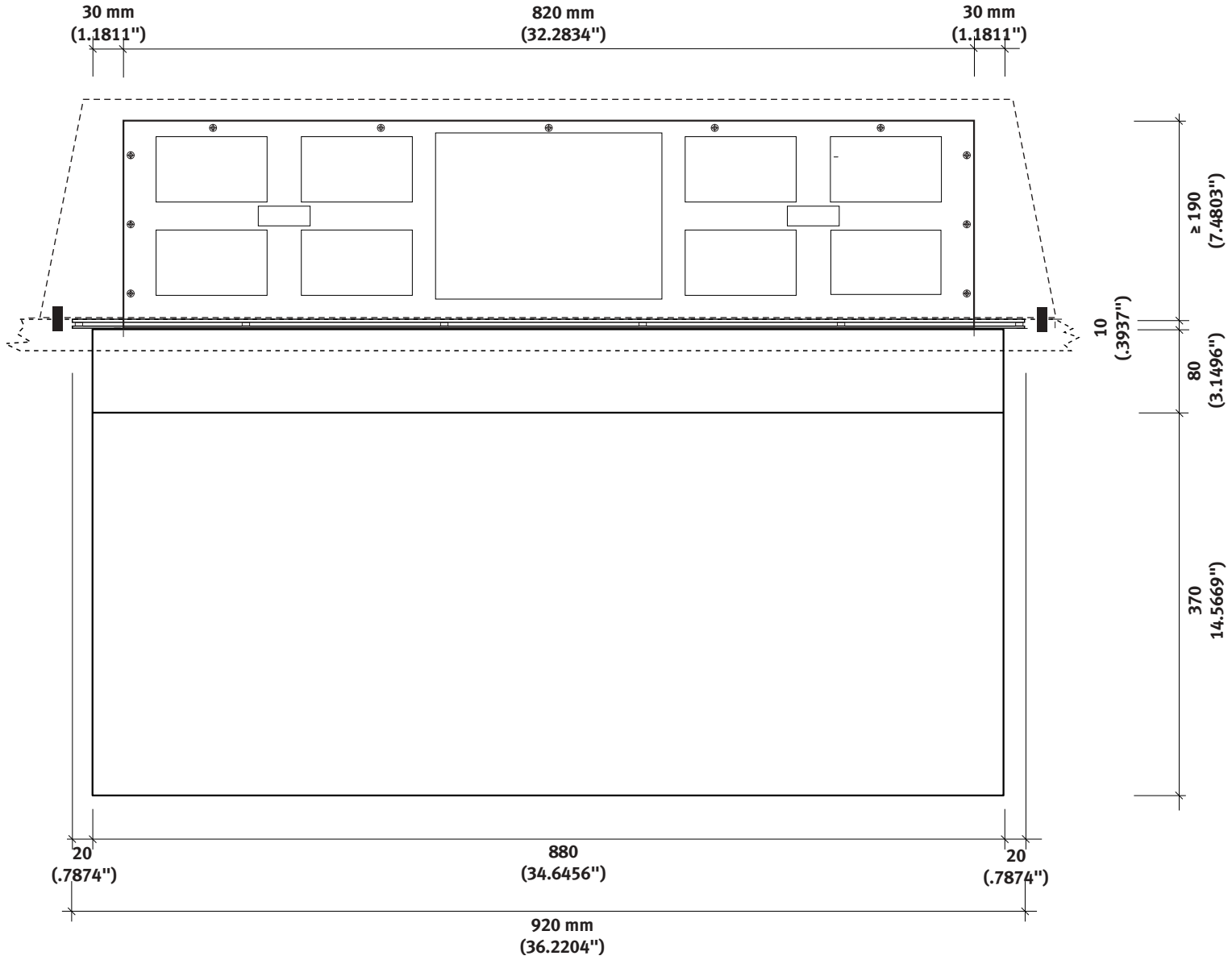

REC OUT
STEREO
L1
R1
L2
R2
L3
R3
L4
R4

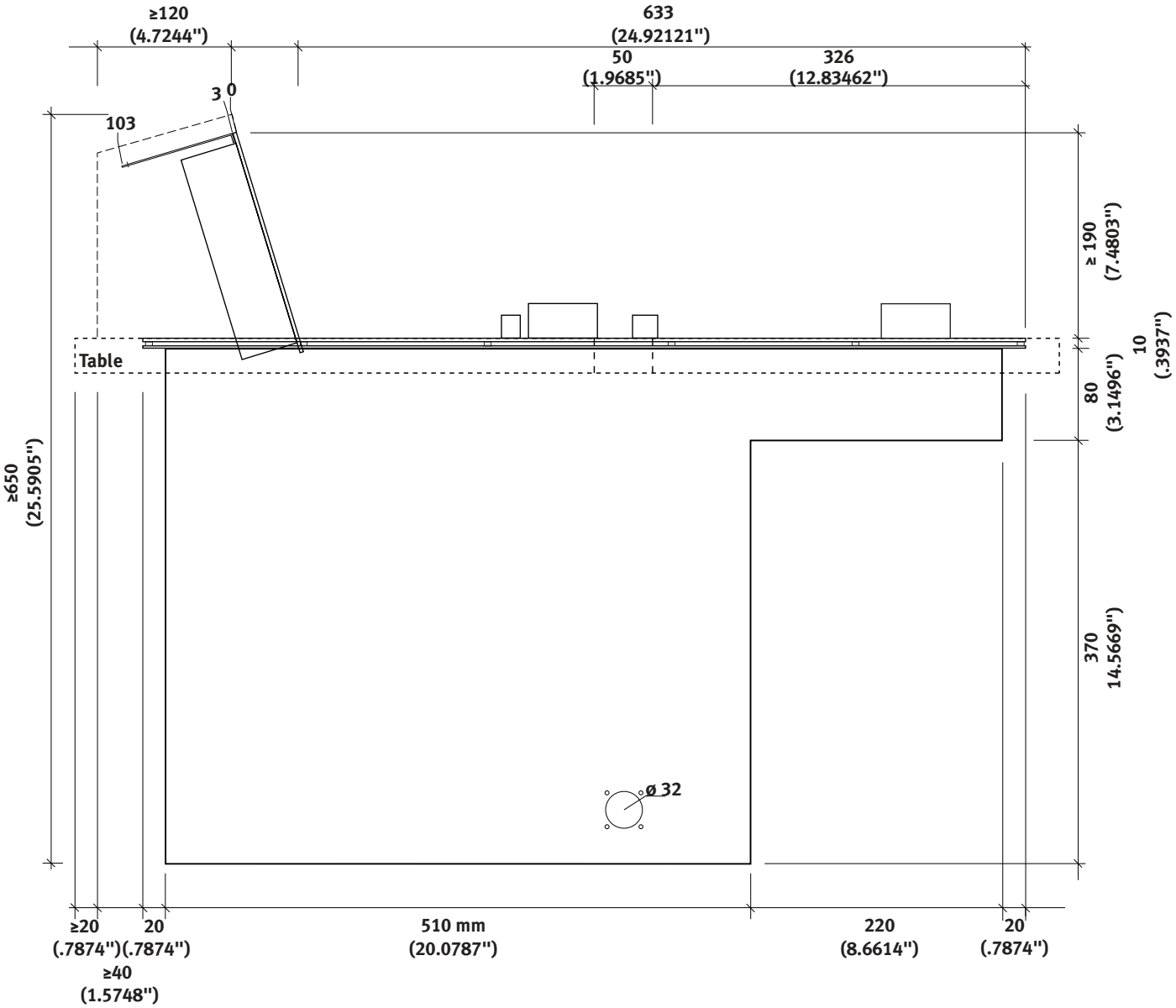
Multi-channel Recording Outputs



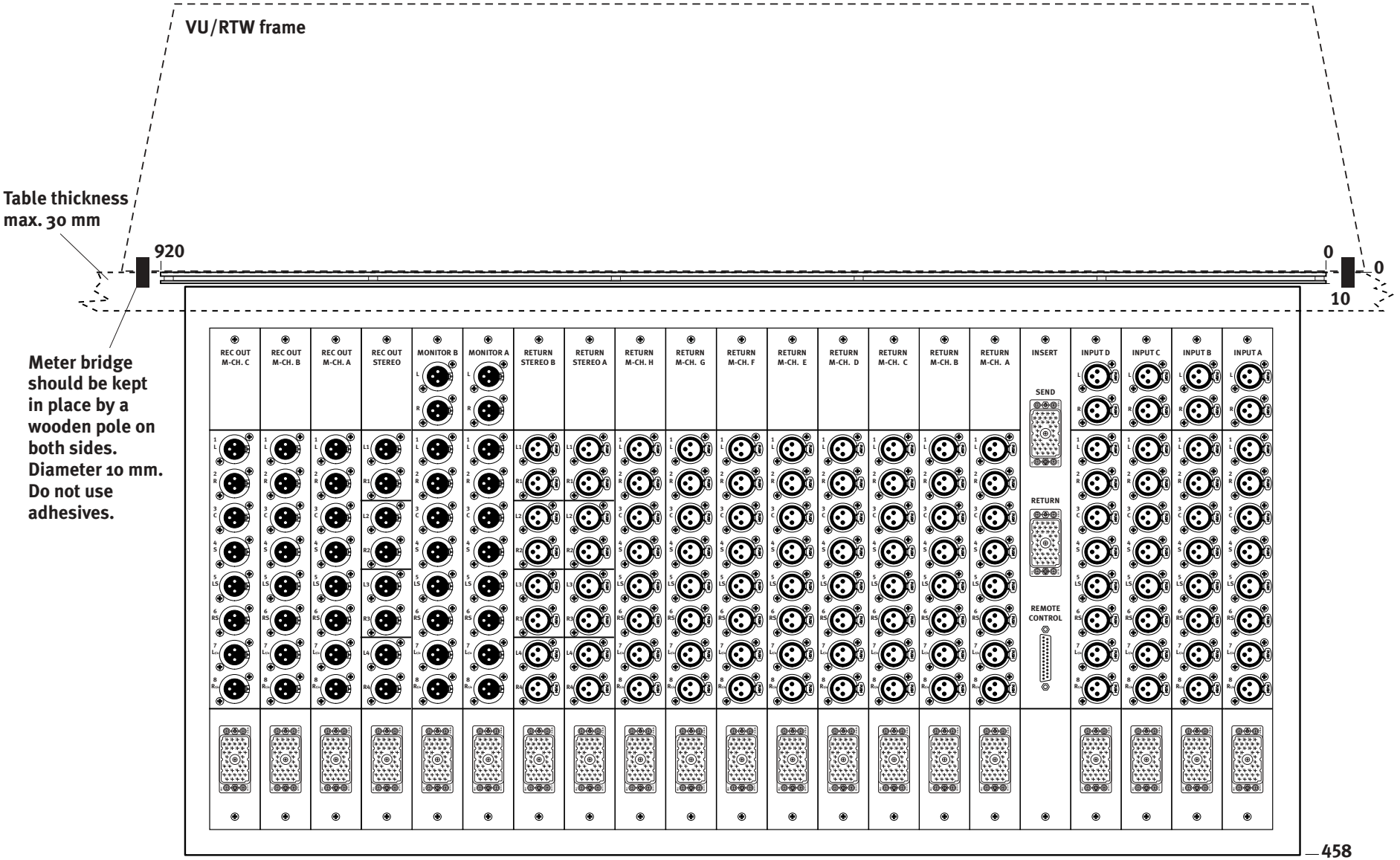

770
752
633
376
326
18
0
0
18
902
920
MMC 1
Multi-Channel Mastering Console
Input
Master
Output
Source
Monitor
Insert
Returns
Inputs
Stereo
M-CH.
Solo to Center
LFE to L/C/R
Speakers
Dim
Monitor Level
Metering
Sequence Position
Processor Selection
Store/ Recall

Mechanical Drawing/Front View



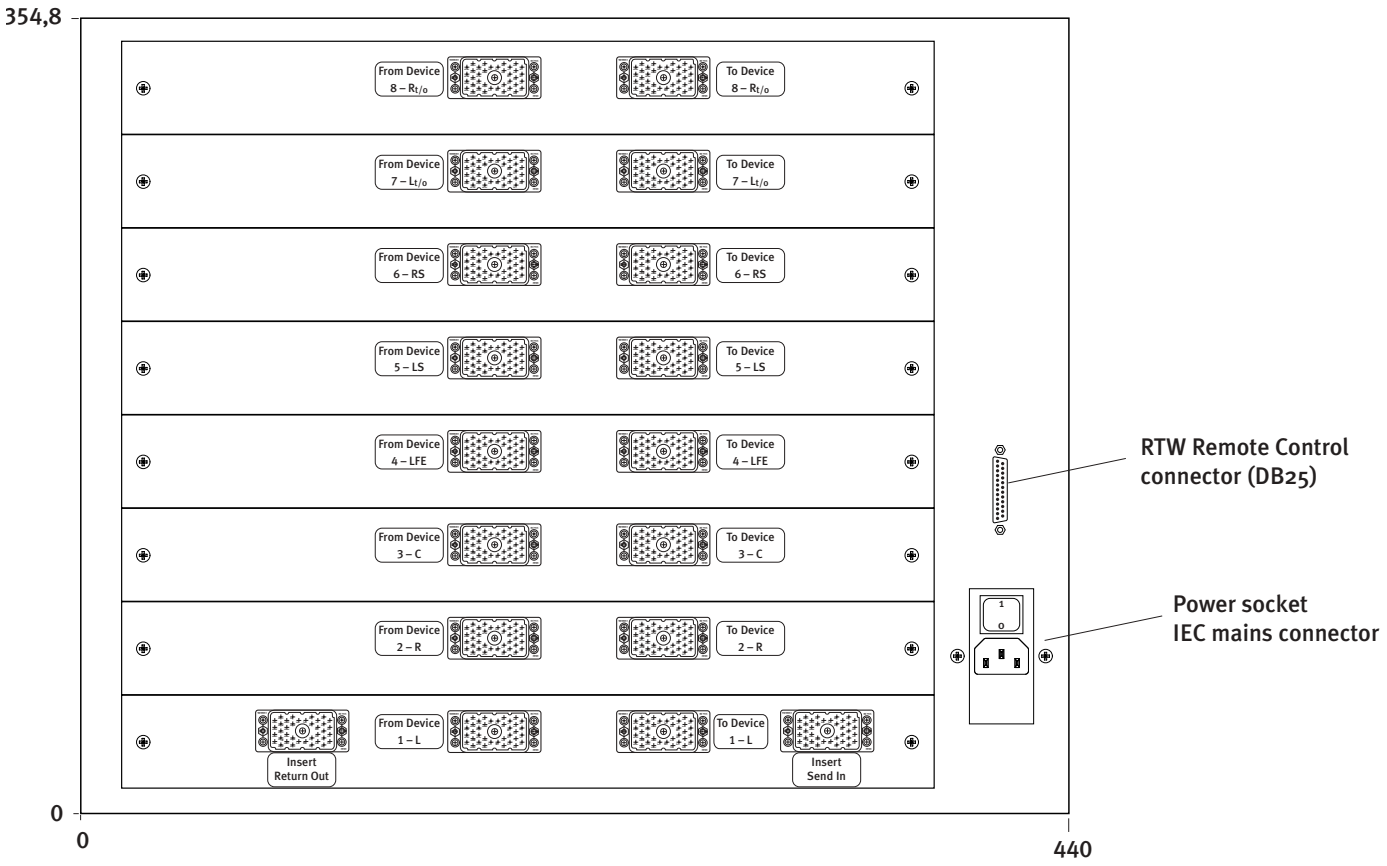

≥120
(4.7244")
633
(24.92121")
50
(1.9685")
326
(12.83462")
3 0
103
≥ 190
(7.4803")
10
(.3937")
Table
80
(3.1496")
≥650
(25.5905")
370
14.5669")
ø 32
≥20
(.7874")
20
(.7874")
≥40
(1.5748")
510 mm
(20.0787")
220
(8.6614")
20
(.7874")

Mechanical Drawing/Rear View

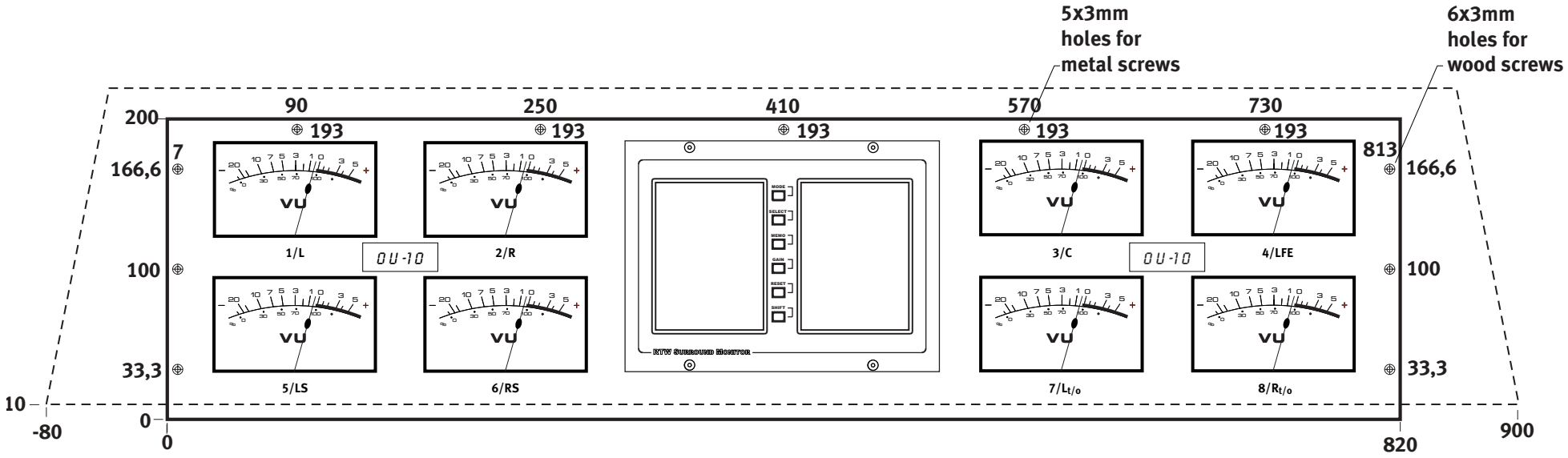


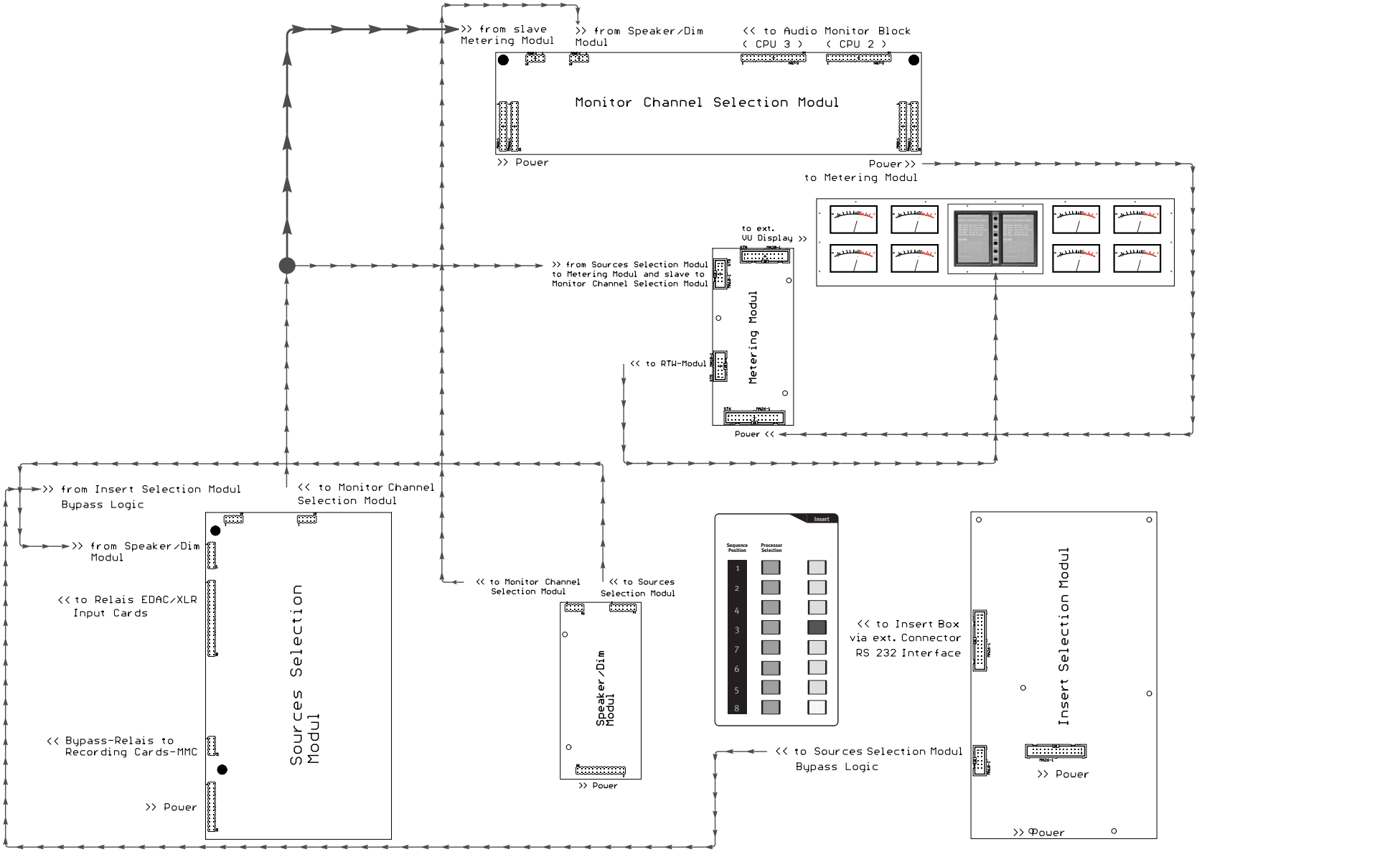
8 U high
Depth: 500 mm

19" mounting is possible if the insert box is to be installed in a 19" rack.



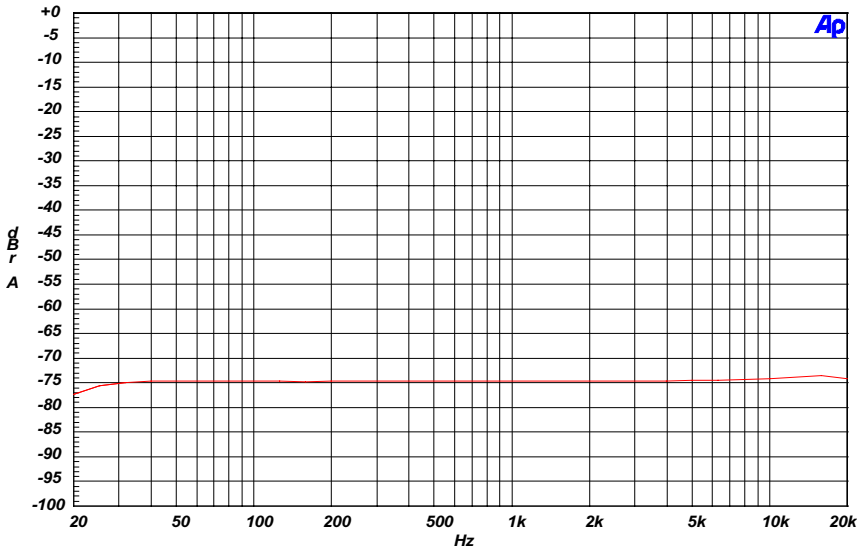
Mechanical Drawing/Meter Bridge




>> from slave Metering Modul
>> from Speaker/Dim Modul
<< to Audio Monitor Block
(CPU 3)
(CPU 2)
Monitor Channel Selection Modul
>> Power
Power >>
to Metering Modul
to ext. VU Display >>
>> from Sources Selection Modul to Metering Modul and slave to Monitor Channel Selection Modul
Metering Modul
<< to RTW-Modul
Power <<
>> from Insert Selection Modul Bypass Logic
<< to Monitor Channel Selection Modul
>> from Speaker/Dim Modul
<< to Relais EDAC/XLR Input Cards
<< to Monitor Channel Selection Modul
<< to Sources Selection Modul
Sources Selection Modul
Speaker/Dim Modul
<< Bypass-Relais to Recording Cards-MMC
>> Power
>> Power
Insert
Sequence Position
Processor Selection
1
2
4
3
7
6
5
8
<< to Insert Box via ext. Connector RS 232 Interface
<< to Sources Selection Modul Bypass Logic
Insert Selection Modul
>> Power
>> Power

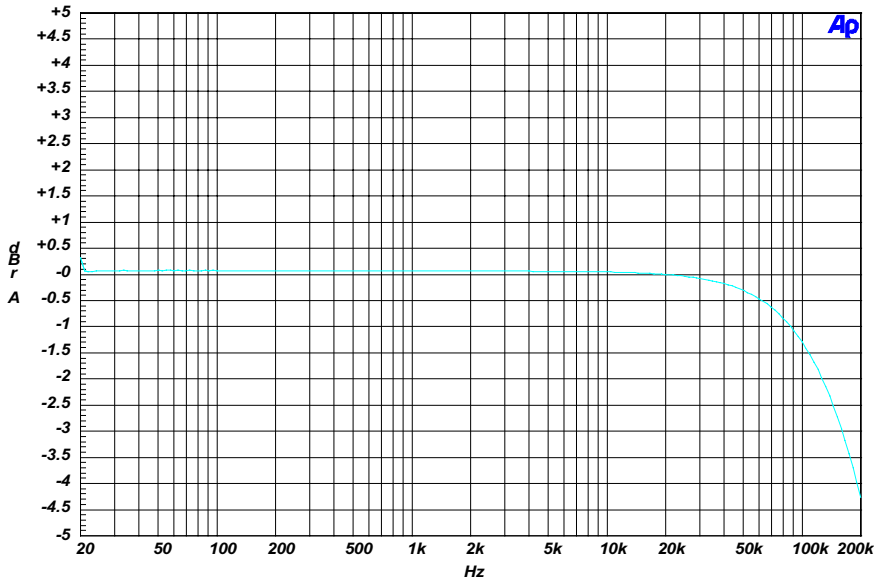
Measurements

Audio Precision *MMC1 CMRR Input - Monitor Out*



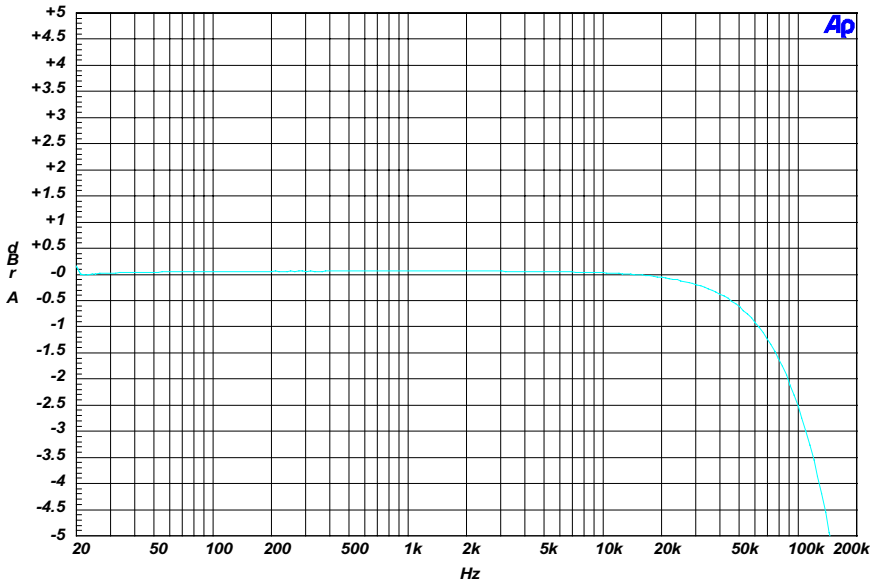
CMRR Input - Monitor Out at 2c

Audio Precision *MMC1 Frequenz Input - Monitor Out*



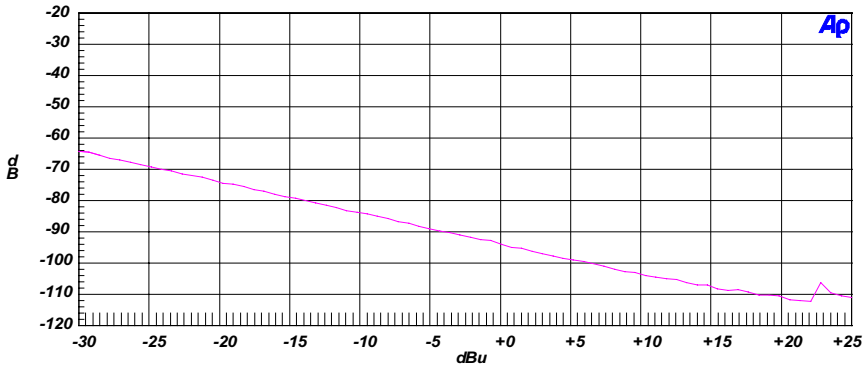
A-A FREQ RESP Input-Monitor at 2c

Audio Precision *MMC1 Frequenz Input - Rec Out*



A-A FREQ RESP Input-Rec Out at 2c

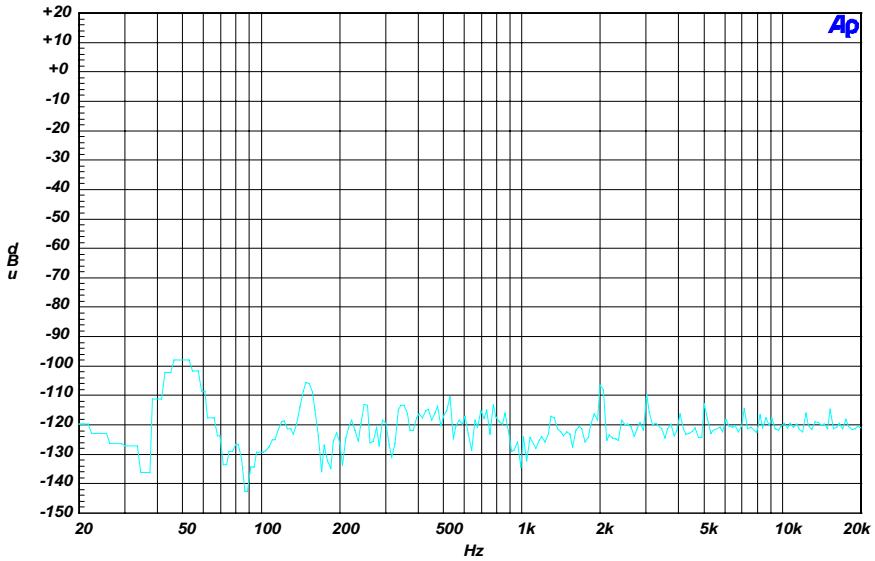
Audio Precision *MMC1 THD+N vs. Amplitude Input-Monitor Out*



A-A THD+N VS AMPL Input-Rec Out at 2c

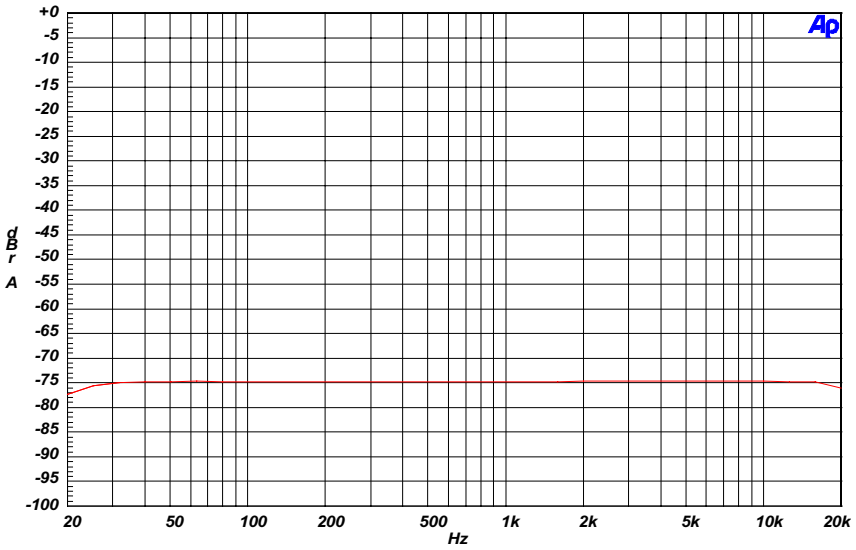
Measurements

Audio Precision *MMC1 FFT Spectrum Input - Monitor Out*

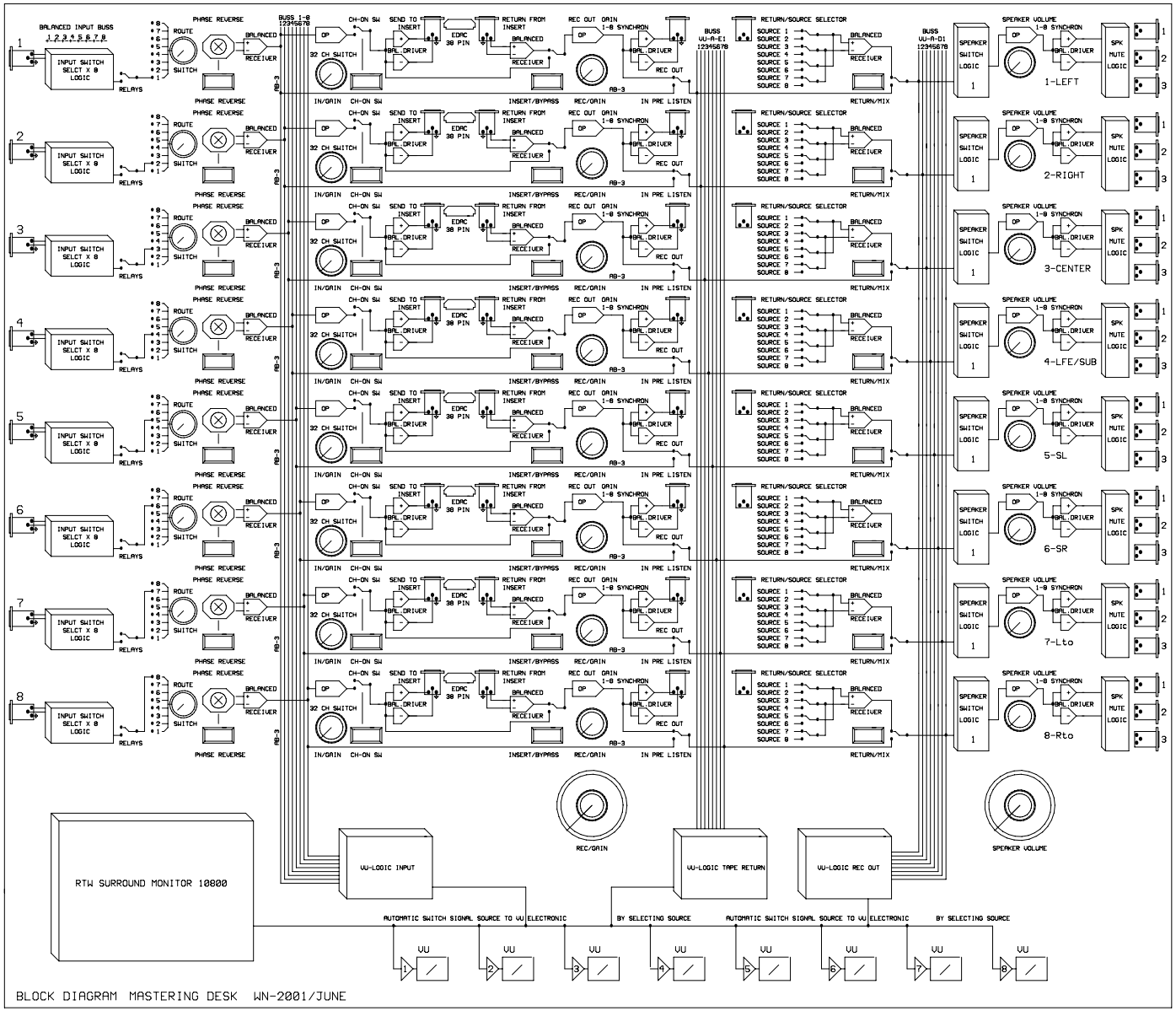


A-A FFT XLR Input - Monitor Out at 2c

Audio Precision *MMC1 CMRR Input - Insert Send*

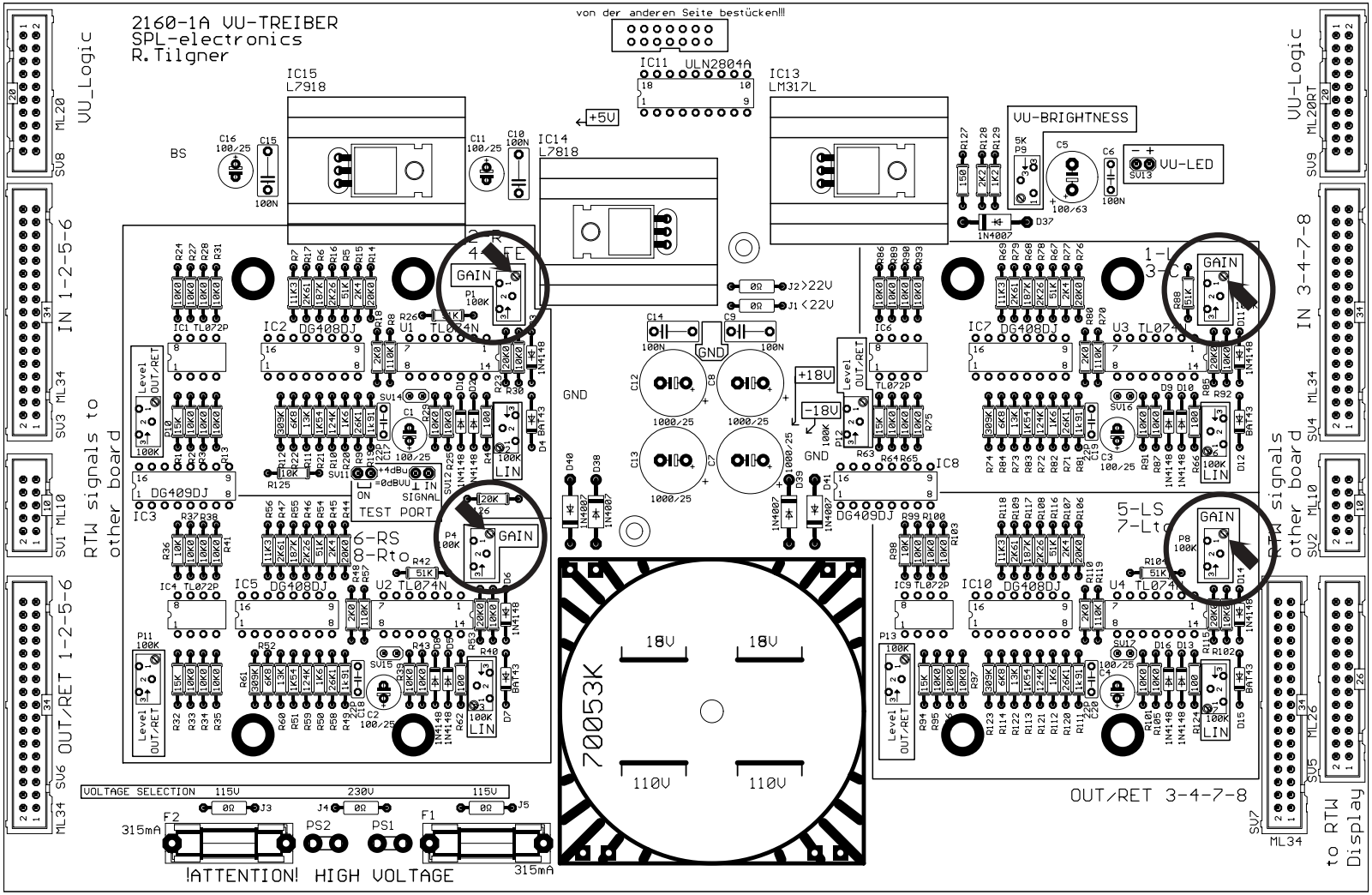


CMRR Input - Insert Send at 2c


BALANCED INPUT BUSS
1 2 3 4 5 6 7 8
INPUT SWITCH SELECT X 8 LOGIC
RELAYS
PHASE REVERSE
ROUTE SWITCH
BALANCED RECEIVER
BUSS 1-8
32 CH SWITCH
CH-ON SW
SEND TO INSERT
RETURN FROM INSERT
EDAC 30 PIN
BAL DRIVER
REC OUT GAIN 1-8 SYNCHRON
REC OUT
AB-3
IN/GAIN
INSERT/BYPASS
REC/GAIN
IN PRE LISTEN
RETURN/SOURCE SELECTOR
SOURCE 1
SOURCE 2
SOURCE 3
SOURCE 4
SOURCE 5
SOURCE 6
SOURCE 7
SOURCE 8
RETURN/MIX
BUSS VU-A-E1 12345678
BUSS VU-A-D1 12345678
SPEAKER SWITCH LOGIC
SPEAKER VOLUME 1-8 SYNCHRON
SPK MUTE LOGIC
1-LEFT
2-RIGHT
3-CENTER
4-LFE/SUB
5-SL
6-SR
7-Lto
8-Rto
REC/GAIN
SPEAKER VOLUME
RTW SURROUND MONITOR 10800
VU-LOGIC INPUT
VU-LOGIC TAPE RETURN
VU-LOGIC REC OUT
AUTOMATIC SWITCH SIGNAL SOURCE TO VU ELECTRONIC
BY SELECTING SOURCE
AUTOMATIC SWITCH SIGNAL SOURCE TO VU ELECTRONIC
BY SELECTING SOURCE
VU
BLOCK DIAGRAM MASTERING DESK WN-2001/JUNE

VU Room Temperature Calibration

Please refer to page 7 for details on the room temperature calibration.



External Power Supply

The MMC 1 comes with an extraordinary linear power supply featuring toroidal transformers for optimal audio quality and dramatically reduced inductive disturbance/ interference.

The power supply is divided into two separate parts to constantly provide stable power conditions. One supplies the four Recording Out driver cards (72 SUPRA-OPs), the other part powers the Input, Monitor and Output stages.

Input voltage:	110-120 V/60 Hz or 220-240 V/50 Hz
Noise:	› -100 dBu (@ +/- 60 V)
Housing:	Standard EIA 19-inch 4 U rack chassis
Dimensions:	482 x 176 x 390 mm (W x H x D) ca. 189 3/4 x 69 3/10 x 153 1/2 inch (W x H x D)
Weight:	21,3 kg/ ca. 46.96 lbs

Warranty

SPL electronics GmbH (hereafter called 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