7. Operation

7.1 Assign channel function parameters

The following is a short description of how to operate RM3200D:

All configured functions can be adjusted using the Main Module. These are e.g. the setting of the pre-amplifier, phantom powering, phase inversion, Panorama/Balance, equalizers, dynamic functions, program-bus- and aux-bus-switching. The values are set using keys and the rotating knob on the Main Module. The operation of these functions can be locked from the control desk. The function can then be used with an identification only.

For adjusting the parameters of a channel, press the Access key at the fader. After that, use the rotary knob and keypad to carry out the desired adjustments.

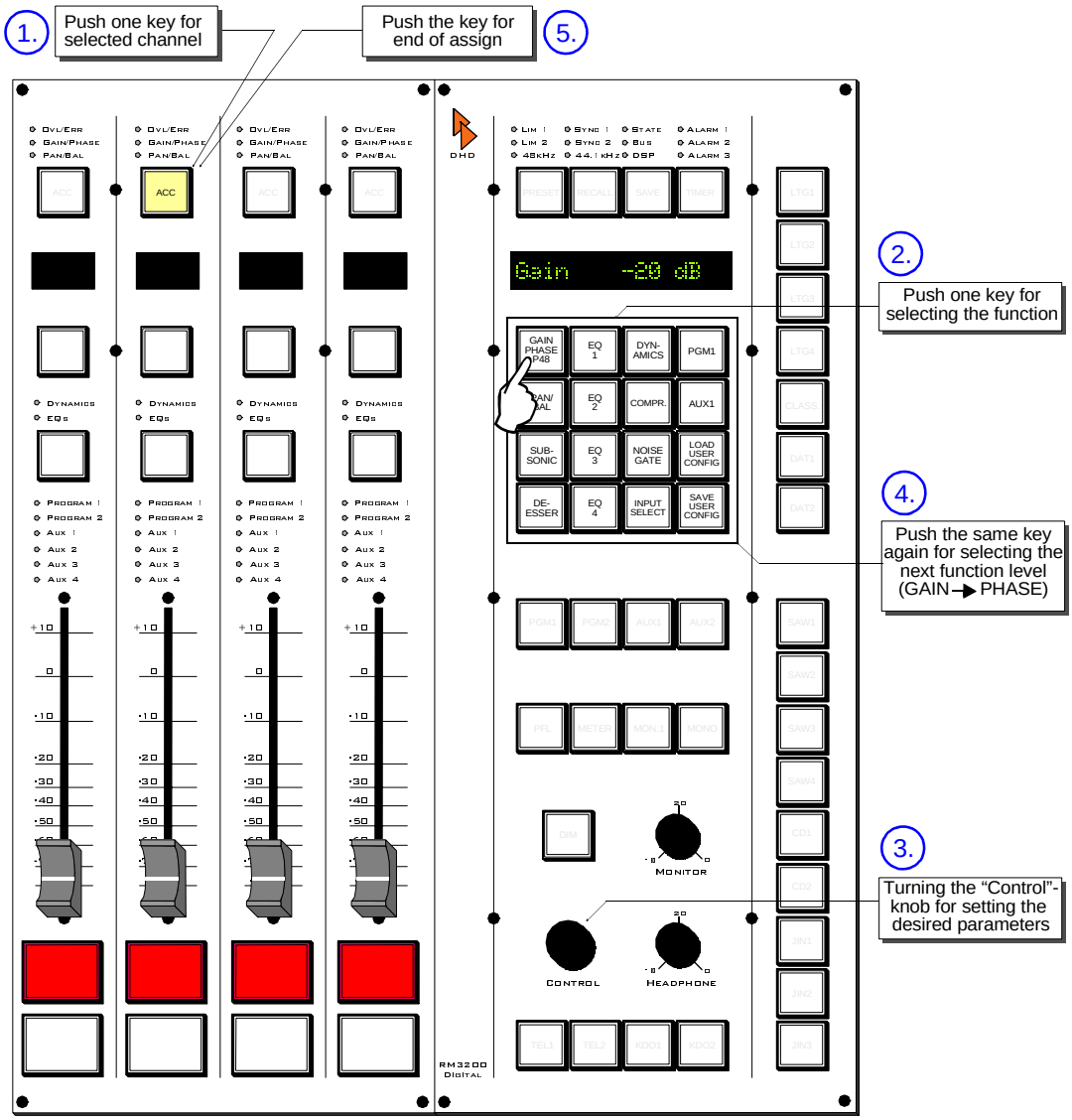


Figure 156: Adjustment of parameters for a channel

Proceed as follows:

1. Select the channel to be adjusted by pressing the Access-key “ACC” at the fader. The key is now lit.
2. Select the function to be adjusted on the keypad.
3. Set the desired parameters by turning the rotary knob labelled “Control”. By pressing the key again you are entering its next function (e.g. Gain becomes PHASE after pressing).
4. Quit the function by using a new function or switching off the Access key “ACC” at the fader.

The user is informed about the setting of the function itself by a 16-digit display in the main module.

Key “GAIN/ PHASE/ P48”

Menu Level	Description	Adjustment Range	Steps
1.: Gain	digital pre-amplifier	-20 dB ... 20 dB	1dB steps
2.: Phasereverse	phase inversion	ON / OFF	
Only for Mic Channel:			
1.: Gain	digital pre-amplifier	-20 dB ... 20 dB	1dB steps
2.: AGain	analog pre-amplifier	0 dB ... 50 dB	5dB steps
3.: Phasereverse	phase inversion	ON / OFF	
4.: Phantom:	phantom powering 48 V	ON / OFF	

Table 18: Levels of key “GAIN/ PHASE/ P48”

Key “PAN/ BAL”

Menu Level	Description	Adjustment Range	Steps
Only for mono input			
1.: Pan	panorama setting	L10 ... 10R	10 steps in each direction
Only for stereo input			
1.: Bal	balance setting	L10 ... 10R	10 steps in each direction
2.: Chan	channel setting	L>L R>R L>L L>R R>L R>R R>L L>R Mono Mono -3 dB Mono -6 dB	

Table 19: Levels of key “PAN/ BAL”

Key “SUBSONIC”

Menu Level	Description	Adjustment Range	Steps
1.: SubS 1	subsonic	ON / OFF	
2.: SubS 1Freq	subsonic frequency	32 Hz ... 200 Hz	in 17 steps

Table 20: Levels of key “SUBSONIC”

Key “DEESSER”

Menu Level	Description	Adjustment Range	Steps
1.: DeEs 1		ON / OFF	
2.: DeEs 1Freq	dwell frequency setting	1.000 Hz ... 20.000 Hz	in 26 steps
3.: DeEs 1Thr.	threshold setting	-40 dB ... 10 dB	1dB steps

Table 21: Levels of key “DEESSER”

Key “EQ”

Menu Level	Description	Adjustment Range	Steps
1.: EQ 1	equalizer setting	ON / OFF	
2.: EQ 1	equalizer setting	Bell/ Notch/ Shelving Hi/ Shelving Lo	bell filter/ notch filter/ shelving filter high/ shelving filter low/
3.: EQ 1Gain	amplification setting	-15 dB ... 15 dB **(Not for Notch)**	1 dB steps
4.: EQ 1Freq	frequency setting	22 Hz ... 20.000 Hz	in 60 steps
5.: EQ 1Qual	factor of quality	0,3 Oct. ... 3,0 Oct. **(Not for Shelving)**	0,1 Oct. steps

Table 22: Levels of key “EQ”

Key “LIMITER”

Menu Level	Description	Adjustment Range	Steps
1.: LIM 1	limiter setting	ON / OFF	
2.: LIM 1Thr.	threshold setting	-20 dB ... 20 dB	1 dB steps
3.: LIM 1Rel.	release time setting	6 dB/s ... 20 dB/s	1 dB steps

Table 23: Levels of key “LIMITER”

Key “COMPR.”

Menu Level	Description	Adjustment Range	Steps
1.: COMP 1	compressor setting	ON / OFF	
2.: COMP 1Rot.	compr. rotation setting	-50 dB ... 10 dB	1dB steps
3.: COMP 1Rat.		1,0 : 1 ... 5,0 : 1	0,1 steps
4.: COMP 1Att.	attack time setting	fast ... slow	in 8 steps
5.: COMP 1Rel.	release time setting	fast ... slow	in 8 steps
6.: COMP 1Gain	amplification setting	0 ... 30 dB	1dB steps

Table 24: Levels of key “COMPR.”

Key “NOISE GATE”

Menu Level	Description	Adjustment Range	Steps
1.: GATE 1	noise gate setting	ON / OFF	
2.: GATE 1Thr.	threshold setting	-60 dB ... -10 dB	1dB steps
3.: GATE 1Atn..		0 ... 30 dB	1dB steps
4.: GATE 1Att.	attack time setting	fast ... slow	in 8 steps
5.: GATE 1Rel.	release time setting	fast ... slow	in 8 steps

Table 25: Levels of key “NOISE GATE”

Key “INPUT SELECT”

Menu Level	Description	Adjustment Range	Steps
1.: Select Input		Änderung im Display Faderzug	

Table 26: Levels of key “INPUT SELECT”

Key “PGM1”

Menu Level	Description	Adjustment Range	Steps
1.: PGM 1		ON / OFF	

Table 27: Levels of key “PGM1”

Key “AUX1”

Menu Level	Description	Adjustment Range	Steps
1.: AUX 1Gain	amplification setting	OFF ... 15 dB	1 dB steps
2.: AUX 1	type of aux phats	Pre Switch/ Pre Fader/ Post Fader/ Program	

Table 28: Levels of key “AUX1”

Key “LOAD USER CONFIG”

Menu Level	Description	Adjustment Range	Steps
1.: Load User	load settings of user „n“	0 ... 250	in 250 steps

Table 29: Levels of key “LOAD USER CONFIG”

Key “SAVE USER CONFIG”

Menu Level	Description	Adjustment Range	Steps
1.: Save User	save settings of user „n“	1 ... 250	in 250 steps

Table 30: Levels of key “SAVE USER CONFIG”

Key “MPX IN”

Menu Level	Description	Adjustment Range	Steps
1.: MPX IN Pre.		ON / OFF	
2.: MPX IN Gain		-15 dB ... 15 dB	1dB steps

Table 31: Levels of key “MPX IN”

Key “MPX OUT”

Menu Level	Description	Adjustment Range	Steps
1.: MPX OUT Gain		-30 dB ... 10 dB	1dB steps
2.: MPX OUT N-1 Mix		N Mix	
3.: MPX OUT Back		ON / OFF	
4.: MPX OUT Spec.		ON / OFF	

Table 32: Levels of key “MPX OUT”

Input

- Phantom powering 48 V
- Subsonic filter
- Phase inversion (in stereo path only right channel)
- Digital pre-amplifier -20 ... +20 dB, analog pre-amplifier -20 ... +70 dB
- Panorama setting on mono inputs, balance setting on stereo inputs

Equalizer

- Amplification setting max. ±15 dB in steps of 1 dB
- Specification of the frequency as -3 dB limiting frequency in relation to the set amplification
- Shelving filter Low, Low pass: frequency 22Hz .. .20 kHz or
- Shelving filter High, High pass: frequency 22Hz ... 20 kHz or
- Parametric mid-filter, band pass: frequency 22Hz ... 20 kHz, factor of quality 0.3 ... 3 octaves or
- Notch filter: frequency range 22Hz ... 20 kHz
- Filters can be switched in bypass mode separately.
- On stereo inputs, filters are stereo-coupled.

Dynamic unit

- Compressor, expander/noise gate, limiter
- On-/off-switchable (bypass)
- Stereo coupling of the dynamic unit at stereo inputs
- 7 different attack and release times
- Holding time after attack time: 40 ms
- 4 different compression- and expansion factors
- Adjustable amplification (Gain) or compression 0 ... 12 dB
- Adjustable threshold of the expander/noise gates -40 ... -10 dB
- Limiter with adjustable threshold -20 ... +20 dB, release time 1 to 10dB/s

Deesser

- Setting of dwell frequency and threshold

Summation- and Aux-bus connection

- Bus routing and choice of type of Aux paths
- The current sum path routing of a fader is displayed with the green LEDs “Program 1,2” above the fader. The same applies to the 4 Aux paths.

8. Installation and Maintenance

8.1 CAN Bus

The heart of the communication between the DSP Frame and the control desk is the CAN Bus. This is a very rugged and reliable industry standard bus system, especially developed for car applications and industry automation systems.

The CAN Bus has only one balanced pair for the bidirectional communication on the bus system. It is necessary to terminate the bus on both ends.

We recommend a:

- maximum distance 15m with 24V power from DSP Frame to control desk
- maximum distance 60m without power supply from DSP Frame to control desk (in this case you will need a separate 24V power supply for the control desk)

Some theoretical informations and related links to the CAN Bus you will find here:

http://141.44.61.248/NT/CAN/Welcome.html

8.1.1 CAN Bus Wiring

The RM3200D is shipped with all necessary cables for the operation, but sometimes the customer needs to make special cabling. We strongly recommend to use only special CAN Bus twisted pair cable with a good shield and the proper wave resistance of 100 to 110 Ohms.

Additionally the RM3200D needs a power pair with a low resistance to achive the lowest possible voltage drop on the cable, because normally the control desk of the RM3200D is supplied with the 24V from the power supplies of the DSP Frame.

Caution: Very important for the proper function of the CAN Bus is the connection of the shield to both sides of the case or chassis and the connection between the shield of the cable and the GND power line on both sides.

Caution: For proper operation it is strongly recommended to use Belden CAN Bus Cable 3086A or 3087A.

Another supplier of cable for the CAN Bus with a power pair is Gotham AG **www.gotham.ch**

Part number: GAC 2/CE AES/2P

Order code: 35550500

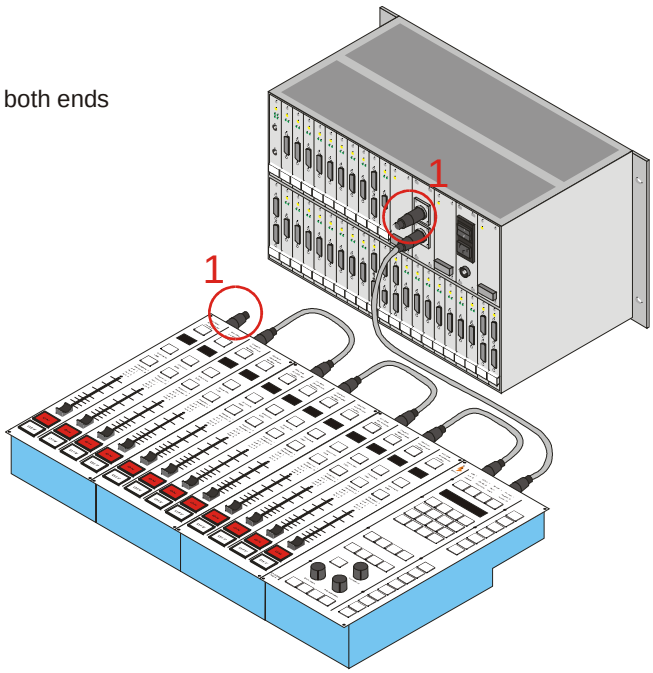
Caution: It is necessary to terminate the bus on *both* ends with a 100 or 110Ohm resistor, only for shorter distances (approx. 1m) the CAN Bus works with only 1 termination resistor.

Refer to the section **Pin Assignments** for the right schematics.

Because the CAN Bus is a chained bus through the whole system, several wirings are possible, some examples you will find on the following pages.

Example 1

Standard application -
termination resistor on both ends

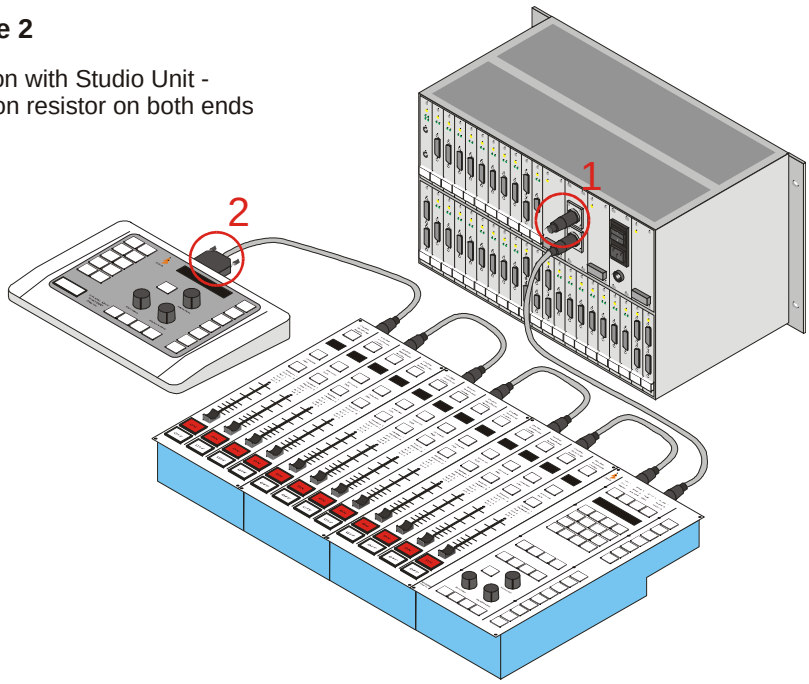


1) 110 Ω termination resistor in XLR Connector without cable

Figure 157: CAN-Bus termination and wiring, example DSP Frame with control desk

Example 2

Application with Studio Unit -
termination resistor on both ends

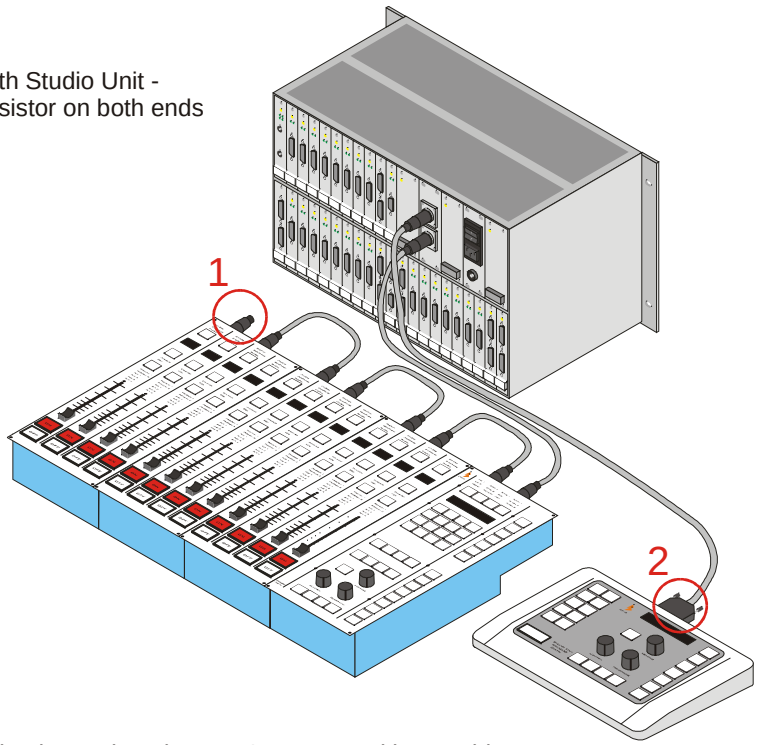


1) 110 Ω termination resistor in XLR Connector without cable
2) 110 Ω termination resistor included in DSub15 Connector for Studio Unit

Figure 158: CAN-Bus termination and wiring, example DSP Frame with control desk and Studio Unit

Example 3

Application with Studio Unit -
termination resistor on both ends

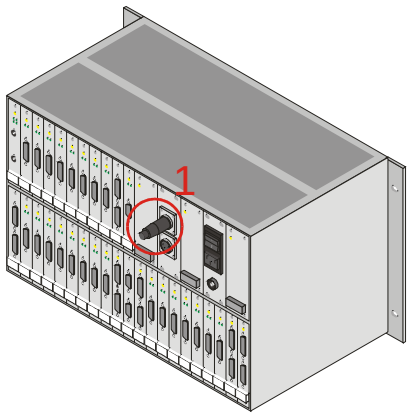


1) 110 Ω termination resistor in XLR Connector without cable
2) 110 Ω termination resistor included in DSub15 Connector for Studio Unit

Figure 159: CAN-Bus termination and wiring, example DSP Frame with control desk and Studio Unit

Example 4

DSP Frame in stand alone application
without long cable -
need termination resistor
only at one end

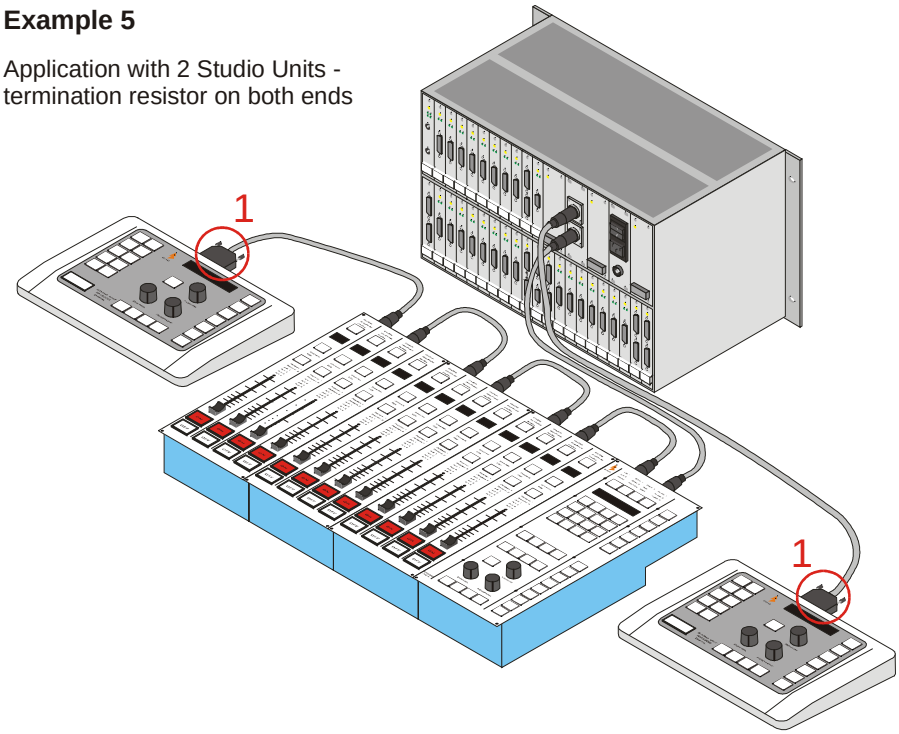


1) 110 Ω termination resistor in XLR Connector without cable

Figure 160: CAN-Bus termination and wiring, example DSP Frame in stand alone application

Example 5

Application with 2 Studio Units - termination resistor on both ends



1) 110 Ω termination resistor included in DSub15 Connector for Studio Unit

Figure 161: CAN-Bus termination and wiring, example DSP Frame with control desk and 2 Studio Units

8.1.2 Pin Assignments

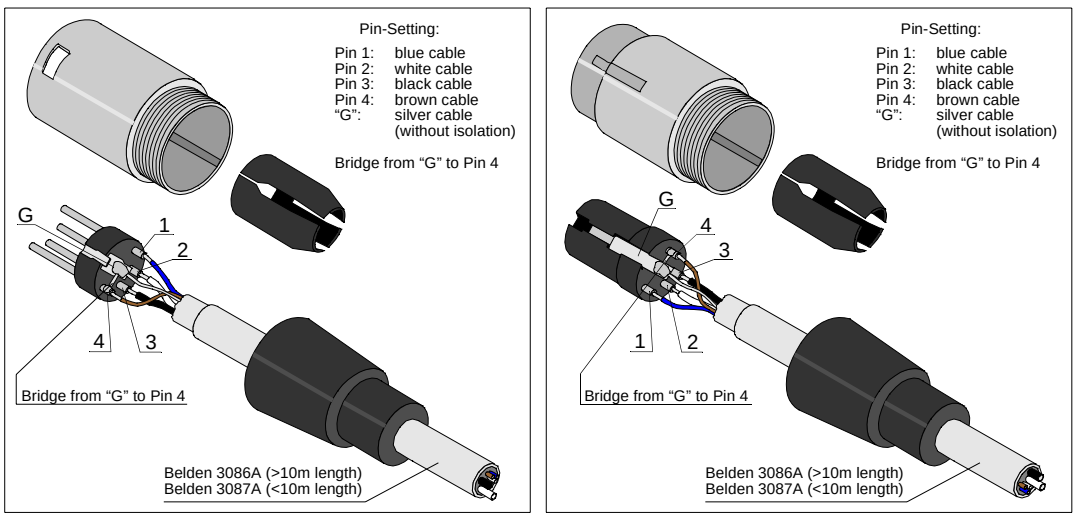
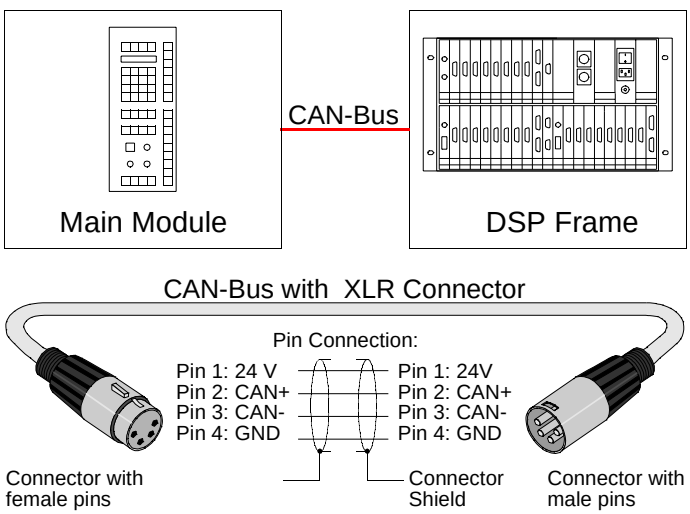
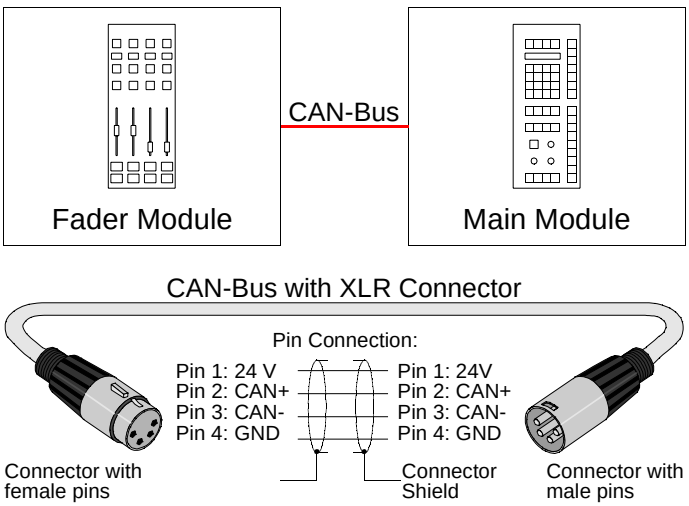


Figure 162: CAN Bus cable



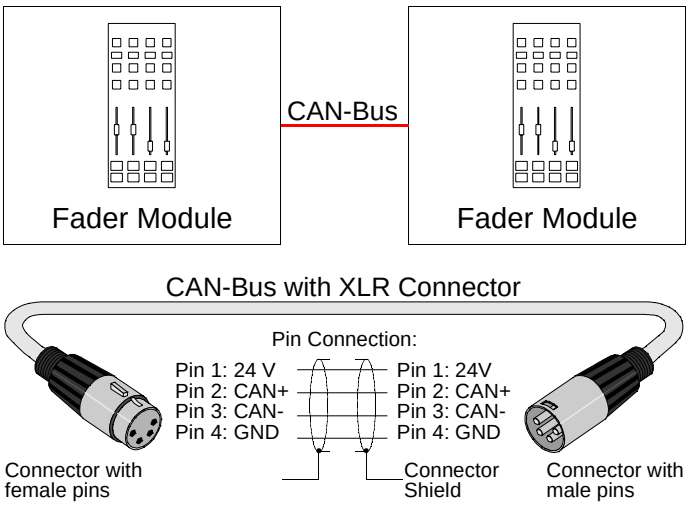
Connection between the DSP Frame and the control desk

Figure 163: DHD standard CAN Bus cable with XLR



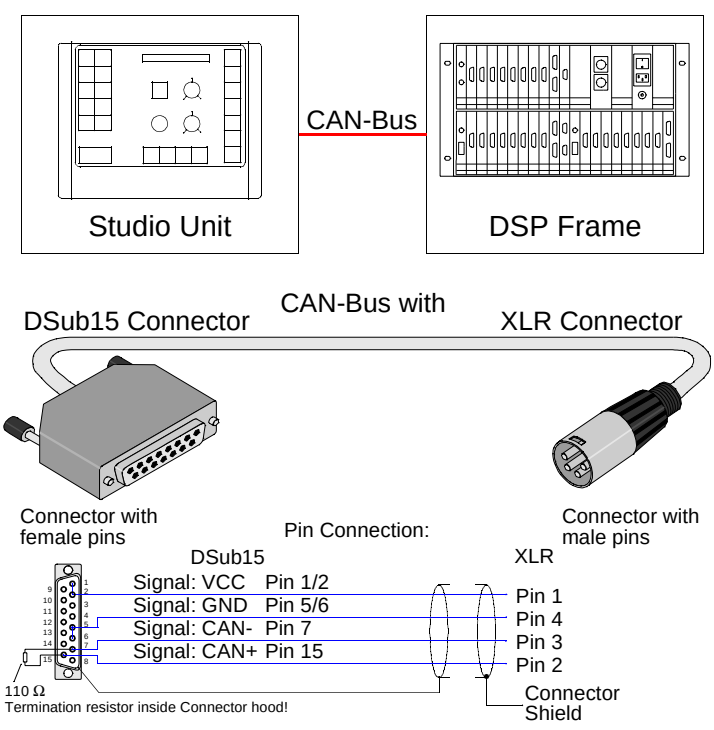
Connection between the two modules of the control desk

Figure 164: DHD standard CAN Bus cable with XLR



Connection between the two Modules of the control desk

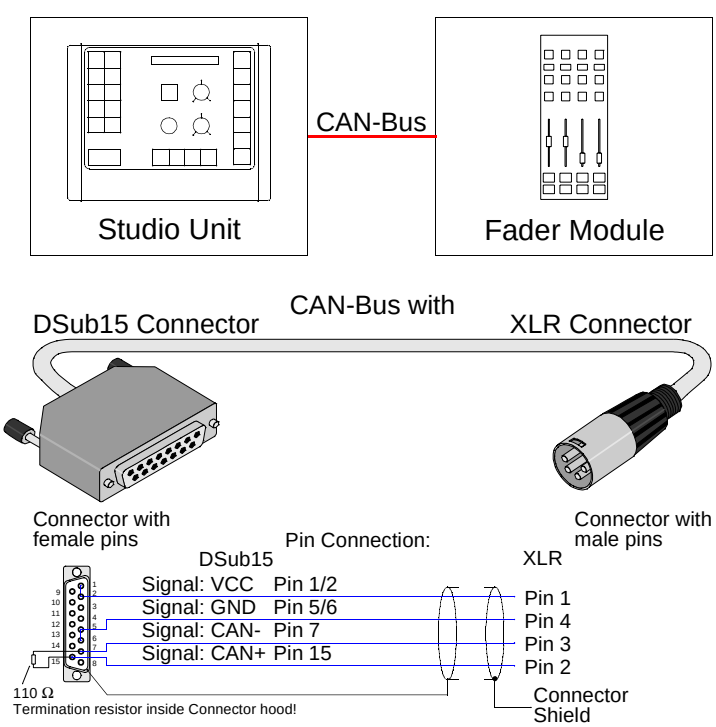
Figure 165: DHD standard CAN Bus cable with XLR



Connection between the DSP Frame and the Studio Unit

Please note the built in termination resistor in the DSub15 connector!

Figure 166: CAN Bus cable XLR/DSub with termination resistor



Connection between the control desk and the Studio Unit

Please note the built in termination resistor in the DSub15 connector!

Figure 167: CAN Bus cable XLR/DSub with termination resistor

8.2 Serial Control RS232 / RS422

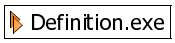
Each CAN Bus module of the RM3200D has its own RS232/422 interface. This interface has the following applications:

- Factory test and maintenance
- Interconnection of several RM3200D systems
- Interconnection between a RM3200D and a system from another company with the DHD Protocol, for example Radio Automation Systems

The serial control port of each module is only a gateway from or to the CAN Bus of the system. You can send any valid DHD Protocol command from outside into the system and it will be processed in the same way like it comes from an internal CAN Bus party.

Some special protocol commands will be also routed out from the CAN Bus to all serial control ports, for example `Global Logic Functions` or `Global Potentiometers`.

The parameters of the serial port are: 38400, 8, N, 1 no protocol. The port is switchable between the RS232 mode (factory default) and the RS422 mode.



The mode can be switched with a special protocol command, which you must send to the module, normally with the `DEFINITION.EXE` in protocol mode:

Command ID: `1FCxxxx` with Data0: `0` to set the interface to RS422

Command ID: `1FCxxxx` with Data0: `1` to set the interface to RS232

Where xxxx is the serial number of the microcontroller module which control port should be switched between RS232 to RS422 or the opposite. For a detailed description of the DHD Control Protocol refer to the section **DHD Control Protocol**.

8.2.1 Wiring of the Serial Control Port

For the wiring of the RM3200D Serial Control Port you need only the signals RX, TX and the signal ground GND. In the RS232 mode RX and TX are unbalanced signals (referred to GND) and in the RS422 mode the RX and TX signals are balanced signals. The serial Control Port is not galvanically isolated.

Important Note: You must connect the GND also in RS422 mode, because the interface is not isolated.

8.2.1.1 RS232

For the connection between a PC and the RM3200D you will need a simple 1 to 1 cable without crossing of the RX and TX pins and male/female connectors.

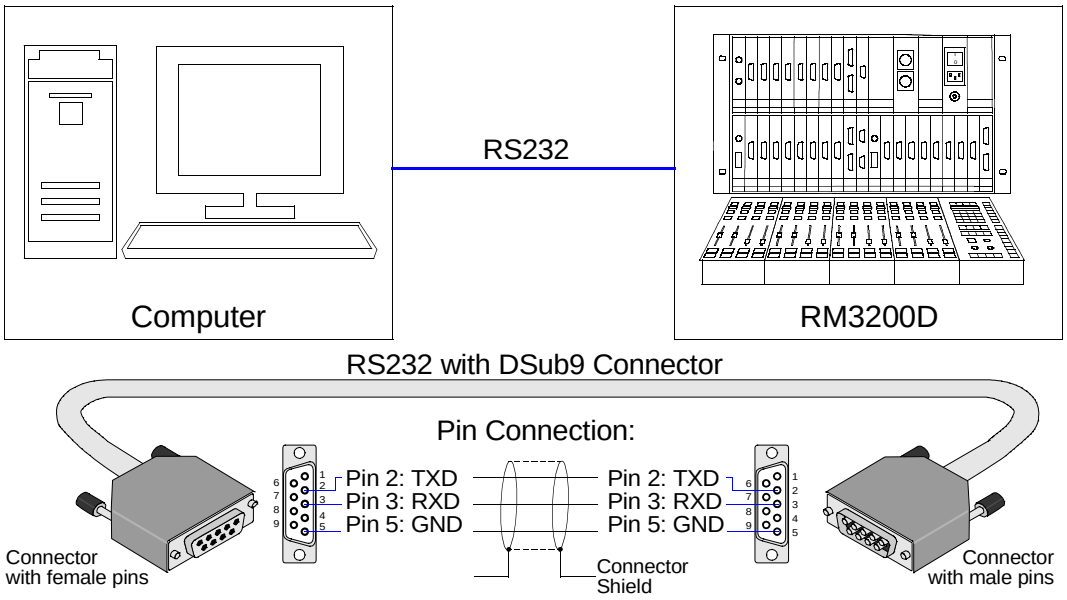


Figure 168: RS232 from PC Com Port to RM3200D

For the connection between two RM3200Ds you will need a crossed cable with male connectors on both sides.

8.2.1.2 RS422

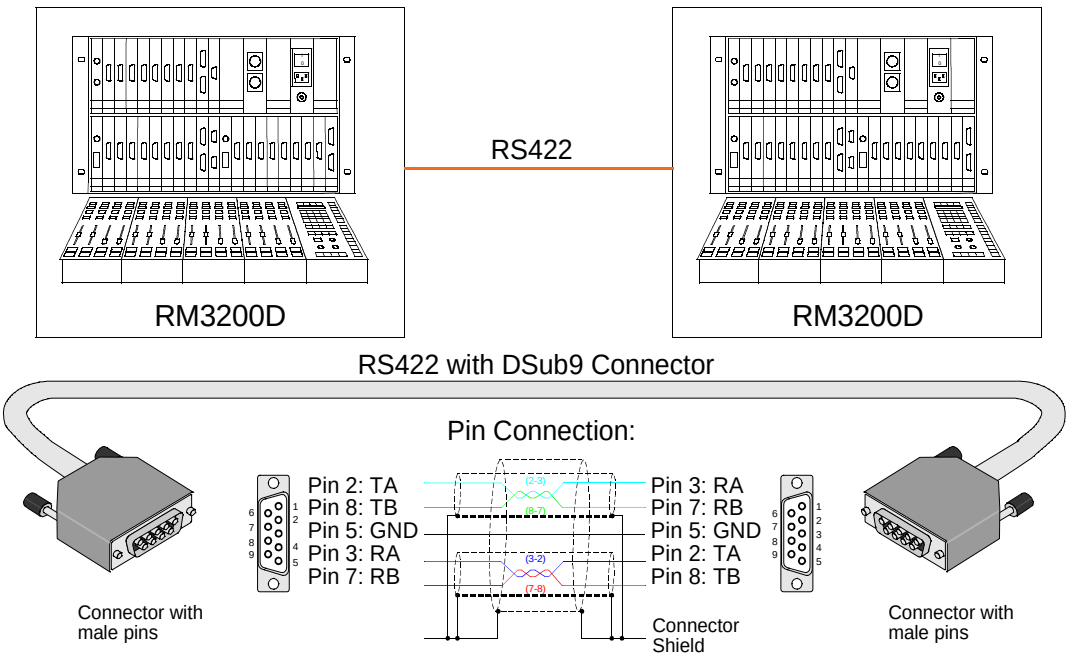


Figure 169: RS422 between two RM3200Ds

8.3 Changing the Hardware Device Address

8.3.1 Fader Module

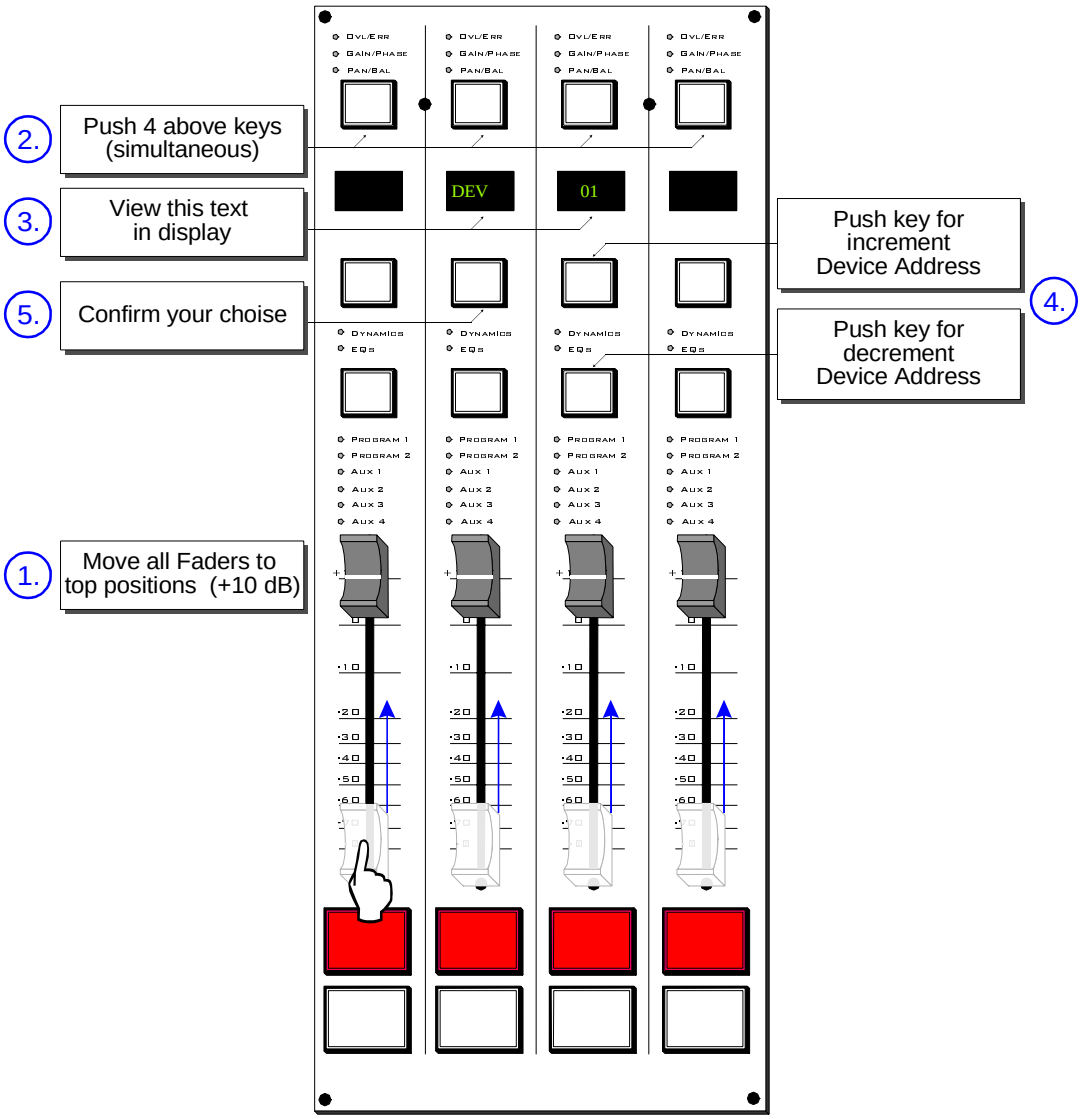


Figure 170: Assign device address of Fader Module

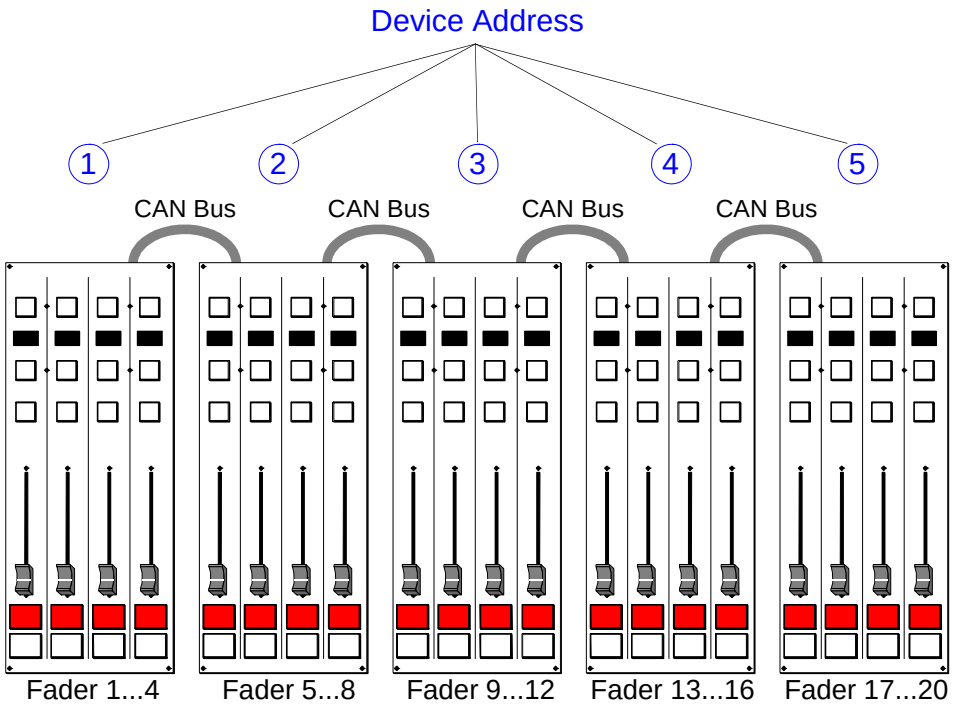


Figure 171: Device address of the Fader Modules

8.4 Cooling and Power Consumption

The device can be operated in normal human surroundings without any ventilation. Active ventilation may be necessary when the system operates in a room without climate control.

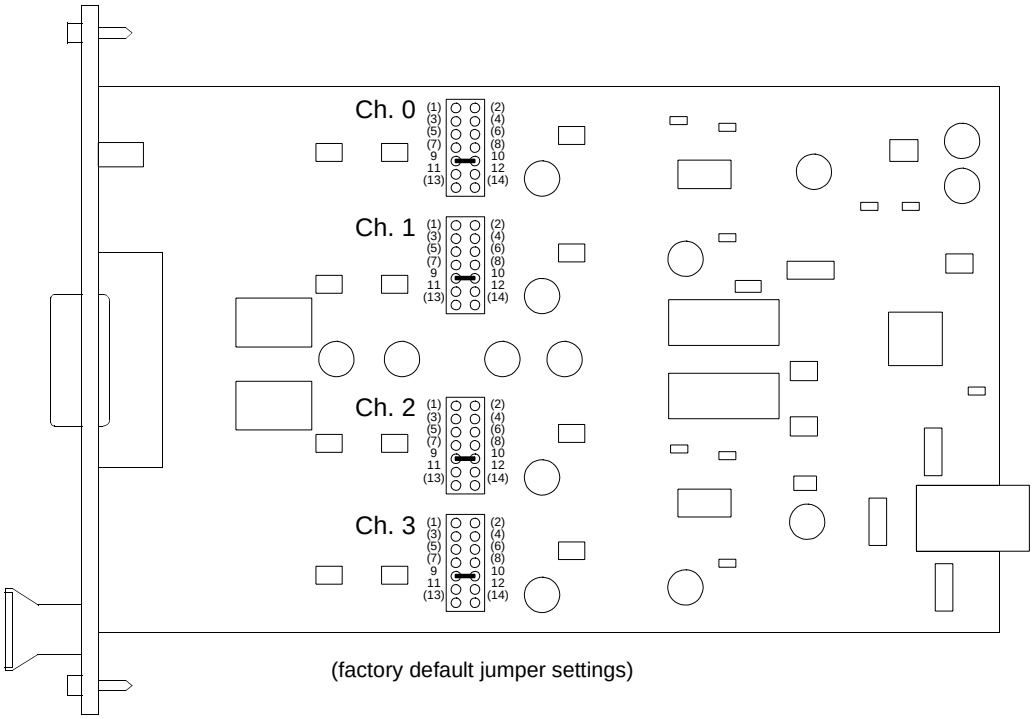
Caution: If mounting the DSP Frame in a rack with passive ventilation, at least 1 U space should be left underneath and above.

The power consumption depends largely on the type and count of modules in the system within a range of approximately 30 to 120W.

8.5 Connectors

8.6 Jumper Settings

8.6.1 Analog Headphone Output Module 330-221



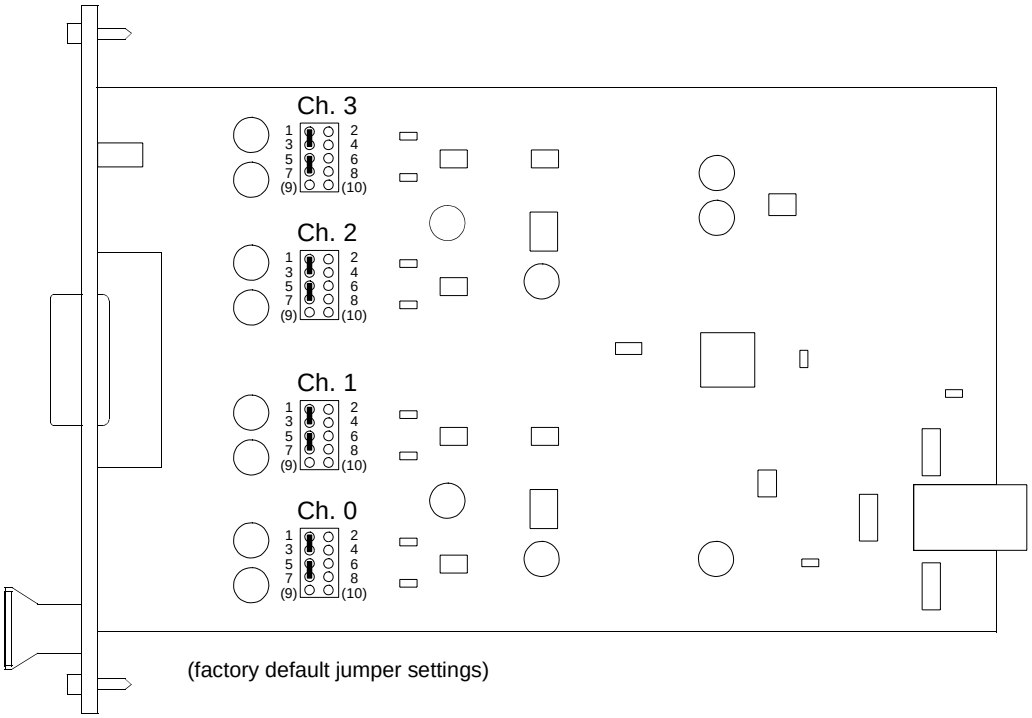
(factory default jumper settings)

Jumper settings		Analog Output Level (balanced output)		Digital Level (after Digital to Analog Conversion)
(1) (2) (no function) (3) (4) (no function) (5) (6) (no function) (7) (8) (no function) 9 10 11 12 (no function) (13) (14) (no function)	jumper on position 9-10 (factory default)	15 dBu 6 dBu	≙ ≙	0 dBFS -9 dBFS
(1) (2) (no function) (3) (4) (no function) (5) (6) (no function) (7) (8) (no function) 9 10 11 12 (no function) (13) (14) (no function)	jumper on position 11-12	18 dBu 6 dBu	≙ ≙	0 dBFS -12 dBFS

Analog Level 6 dBu = 1,55 V_{RMS}
Digital Level 0 dBFS = “Full Scale”

Figure 172:

8.6.2 Analog Line Input Module 330-120



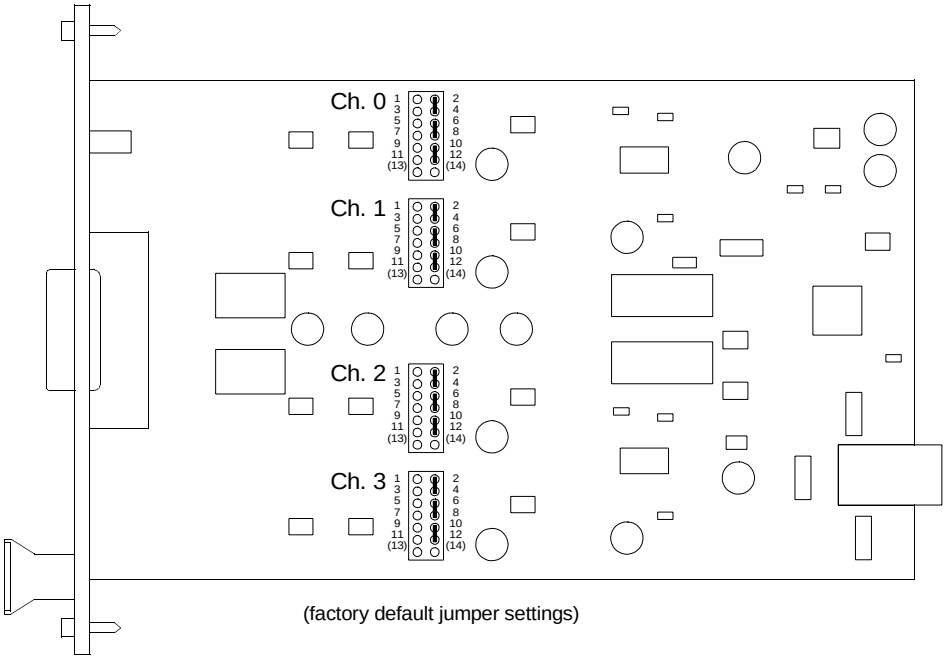
(factory default jumper settings)

Jumper settings		Analog Input Level (balanced input)	Digital Level (after Analog to Digital Conversion)
1 3 5 7 (9) 2 4 6 8 (10) (no function)	jumpers on positions 1-3 and 5-7 (parking position - factory default) or no jumpers	15 dBu ≙ 6 dBu ≙	0 dBFS -9 dBFS
1 3 5 7 (9) 2 4 6 8 (10) (no function)	jumpers on positions 3-4 and 5-6	18 dBu ≙ 6 dBu ≙	0 dBFS -12 dBFS
1 3 5 7 (9) 2 4 6 8 (10) (no function)	jumpers on positions 1-2 and 7-8	21 dBu ≙ 6 dBu ≙	0 dBFS -15 dBFS

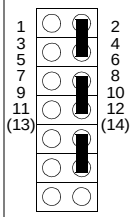
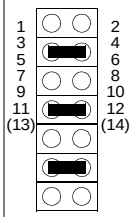
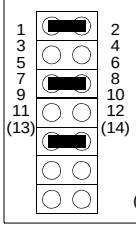
Analog Level 6 dBu = 1,55 V_{RMS}
Digital Level 0 dBFS = “Full Scale”

Figure 173:

8.6.3 Analog Line Output Module 330-220



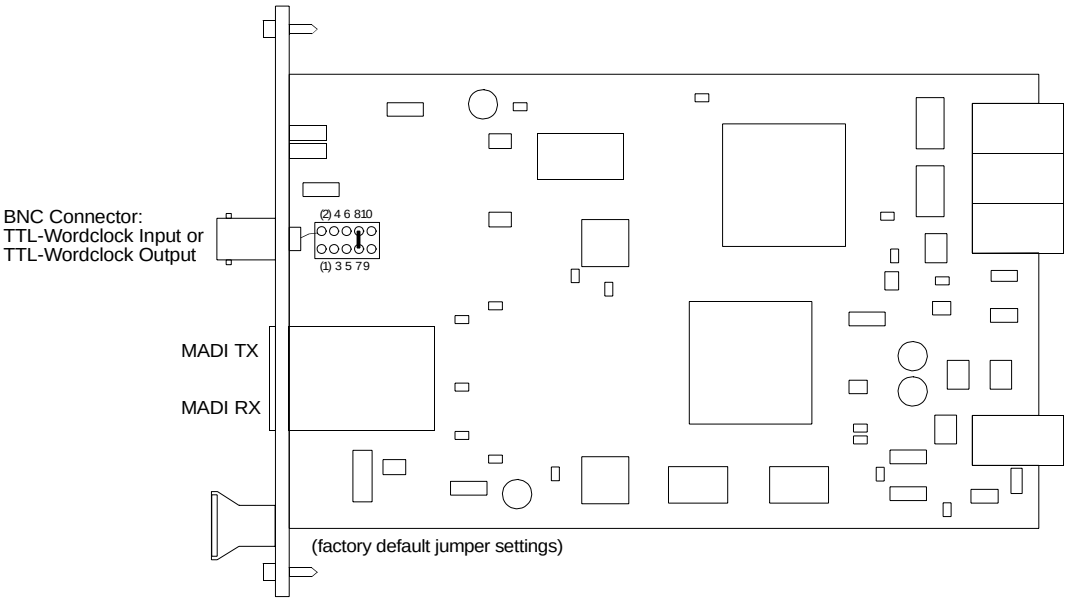
(factory default jumper settings)

Jumper settings		Analog Output Level (balanced output)		Digital Level (after Digital to Analog Conversion)
 (no function)	jumpers on positions 2-4; 6-8; 10-12 (parking position - factory default) or no jumpers	15 dBu 6 dBu	≙ ≙	0 dBFS -9 dBFS
 (no function)	jumpers on positions 3-4; 7-8 and 11-12	18 dBu 6 dBu	≙ ≙	0 dBFS -12 dBFS
 (no function)	jumpers on positions 1-2; 5-6 and 9-10	21 dBu 6 dBu	≙ ≙	0 dBFS -15 dBFS

Analog Level 6 dBu = 1,55 V_{RMS}
Digital Level 0 dBFS = "Full Scale"

Figure 174:

8.6.4 MADI Module 330-421

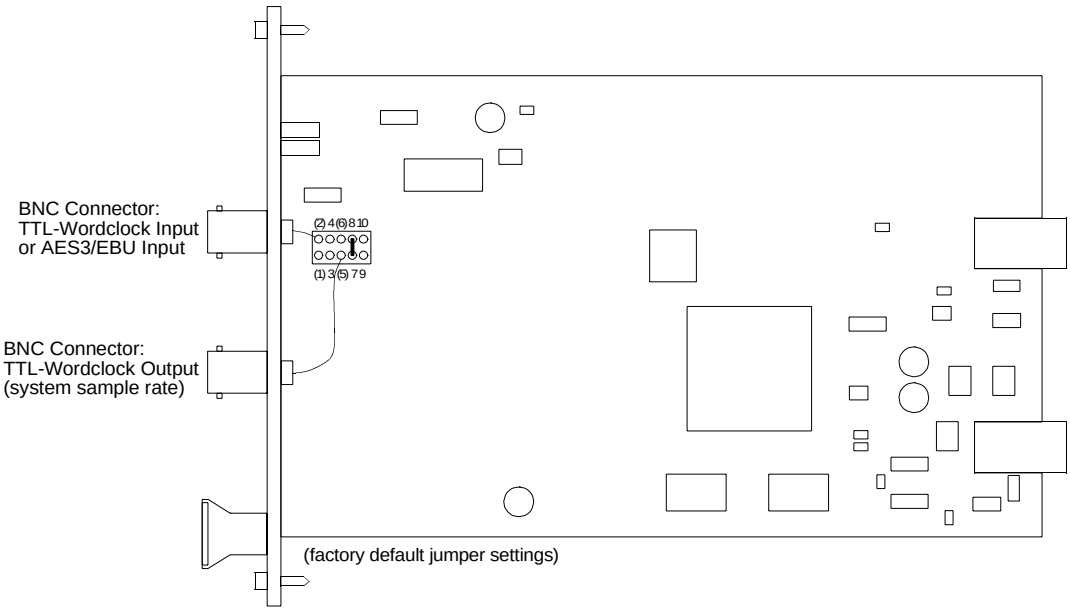


Jumper settings on positions 1 ... 8		Functions
(2)4 6 8 10 (1)3 5 7 9	jumper on position 7-8 (factory default)	75 Ω input termination resistor connected BNC Connector used as TTL Wordclock Input
(2)4 6 8 10 (1)3 5 7 9	no jumper or jumper on position 3-4 (parking position)	no input termination (high impedance input for Sync. bus - not recommended) BNC Connector used as TTL Wordclock Input
(2)4 6 8 10 (1)3 5 7 9	jumper on position 5-6	BNC Connector used as TTL Wordclock Output

Jumper settings on positions 9 ... 10		Functions
(2)4 6 8 10 (1)3 5 7 9	no jumper on position 9-10 (factory default)	frame starts on low to high transition (TTL Wordclock Input and Output)
(2)4 6 8 10 (1)3 5 7 9	jumper on position 9-10	frame starts on high to low transition (TTL Wordclock Input and Output)

Figure 175:

8.6.5 Sync. Module 330-410



Jumper settings on positions 1 ... 8		Functions
(2)4(6)810 (1)4(5)7 9	jumper on position 7-8 (factory default)	75 Ω input termination resistor connected
(2)4(6)810 (1)4(5)7 9	no jumper or jumper on position 3-4 (parking position)	no input termination (high impedance input for Sync. bus - not recommended)

Jumper settings on positions 9 ... 10		Functions
(2)4(6)810 (1)3(5) 7 9	no jumper on position 9-10 (factory default)	frame starts on low to high transition (TTL Wordclock Input and Output)
(2)4(6)810 (1)3(5) 7 9	jumper on position 9-10	frame starts on high to low transition (TTL Wordclock Input and Output)

Figure 176:

8.7 Maintenance

8.7.1 Level Adjustments

Normally no level adjustments on the analog interface modules are necessary.

8.7.2 Bulbs and LEDs

Because we use two different types of push buttons, we have also two different types of lamps. Due to the limited life time of a lamp, you must change the lamps from time to time.

To increase the lifetime of a lamp you can use also Multichip LED Lamps, but these Multichip LED Lamps are not as bright as bulbs.

The RM3200D is factory default equipped with bulbs, LEDs are available as option.

The nominal voltage of the lamps in the push buttons is 24V. To increase the lifetime of the bulbs for a few hours we recommend 28V bulbs. When using Multichip LED Lamps we recommend 24V types.

8.7.3 Faders and Knobs

We use the fader Penny+Giles PGF8100, Type PGF8110/D/M/----/A
with P+G standard knobs. The knobs are available in the colors black (factory default), yellow, red, blue and green.

Faders and knobs as spare parts are available from DHD or your local P+G dealer.

8.7.4 Frontpanels

The frontpanels are coated with lexan skins in white color RAL9016 with black labeling or dark color RAL7024 graphite gray with white labeling.

Not all modules are available in both colors.

When the frontpanels are worn, you can replace the frontpanels easy without soldering work.

White RAL9016	Gray RAL7024
Main Module RM330-010W	Main Module RM330-010G
Fader Module RM330-020W; RM330-021W	Fader Module RM330-020G; RM330-021G
	Studio Unit RM330-011
	Central Module RM330-012G
	Central Overbridge Module RM330-013G
	Fader Overbridge Module RM330-023G

Table 33: Available colors

8.8 Fault Finding

8.8.1 Faults

Symptom	Action

Table 34:

8.9 Anomaly List

8.10 DHD Control Protocol

- Version 1.12 from Software 3.79 (or higher), May 15th, 1999

The data of the serial port are adapted to the CAN Bus protocol, i.e. blocks with up to 8 data words and an ID of 28 Bit are used.

8.10.1 Data transmission

The parameters of the serial port are: 38400, 8, N, 1 no protocol

The values 0x00 ... 0x1F are reserved as control words. If data belongs into this range, they are replaced by the following two bytes “DLE, value+0x20”.

Blocks are sent only in one direction, they are only answered with either ACK or NAK. As an answer with data, another block is sent.

Structure of a block:

STX	L3...L0: ID27...ID24	ID23...ID16	ID15...ID8	ID7...ID0	D0...Dn	PS	ETX

Table 35:

STX: 0x02

L3...L0: Information on length 0..8

ID27...ID0:ID according to description

D0...Dn: Data (0-8 Byte)

PS: Checksum according to the formula below

ETX: 0x03

DLE: 0x0A

ACK: 0x06

NAK: 0x05

This block is answered either with ACK or NAK. The block must be answered within 80 ms. After this time, the block is repeated. Each block is repeated three times maximum, after that the transmission of the block is cancelled. The serial port has a buffer that can store up to 100 blocks. If this buffer is full because all blocks have to be repeated (no throughput), additional blocks are rejected.

A CRC is used as a checksum: $X^{15} + X^{14} + X^{10} + X^8 + X^7 + X^4 + X^3 + 1$

8.10.1.1 Example

```
static unsigned int TxPS;

void SendByte(unsigned char Byte, int Control) {
 int i;
  if (!Control) { /* Prüfsumme ermitteln */
    for (i=0;i<8;i++) {
      TxPS <<= 1;
      if (((TxPS >>15) & 0x01)^((Byte >> i) & 0x01)) TxPS ^=
0x4599;
    }
  }
  if ((!Control) && (Byte<0x20)) {
```

```
    SendChar(COM, DLE);
    Byte += (unsigned char)0x20;
  }
  SendChar(COM, Byte);
}
```

Transmission routine

```
for (; RepCnt>0; RepCnt--) {
  TxPS = 0;
  // Block Senden
  SendByte(STX, 1);
  B = (unsigned char)(((Block.Length<8?Block.Length:8) << 4) +
      ((Block.ID & 0x0F000000L)>>24));
  SendByte(B, 0);
  B = (unsigned char)((Block.ID & 0x00FF0000L)>>16);
  SendByte(B, 0);
  B = (unsigned char)((Block.ID & 0x0000FF00L)>>8);
  SendByte(B, 0);
  B = (unsigned char)((Block.ID & 0x0000000FFL));
  SendByte(B, 0);
  for (i=0;i<Block.Length;i++) SendByte(Block.Data[i], 0);
  SendByte((unsigned char)TxPS, 0); /* PS */
  SendByte(ETX, 1);
  if (!ByteComReceiveTimed(&B, 80)) {
    ErrCnt++;
  }
  else {
    if (B==ACK) {
      ErrCnt=0;
      break;
    }
  }
}
```

8.10.2 Functional principle

All blocks received over a serial port are routed to the internal CAN Bus. All blocks of a specific type are routed by the CAN Bus to the serial port.

8.10.3 Description of data blocks

Only the necessary data blocks are described. The device transmits additional blocks that have to be answered with ACK, but their contents can be ignored. Only the described commands should be sent to the serial port.

Reactions of the device to commands received over the serial port are acknowledged by setting Bit 9.

Commands not to be processed by additional RM3200 are marked by Bit 10.

All data is in Motorola-format (MSW first)

8.10.3.1 Set Monitor channel “SETMONITORCHANNEL”

This command switches the monitoring number 1...6 to the set channel.

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000100	6	ChannelHi Left	ChannelLo Left	Number	0	ChannelHi Right	ChannelLo Right		

Table 36:

Channel: 0x0000...0x001F Channel of the mixer
0x0060...0x3FFF Input channel of the mixer
0x4000...0x7FFF Summations and special channels
Number: Number of the set monitoring (1..6)

8.10.3.2 Set PFL “SETPFL”

This command switches the PFL of each channel.

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000116	0/4	ChannelHi	ChannelLo	On	Auto Mute				

Table 37:

Channel: 0x0000...0x001F Channel of the mixer
On: 1 Switch on / 0 Switch off
Auto Mute: 1 All other channels are switched PFL off,
0 the other channels remain unchanged
Length 0: Switch off all

8.10.3.3 Switch channel on/off “SETCHANNELON”

Mixer channel is switched on or off

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000102	3	ChannelHi	ChannelLo	On					

Table 38:

Channel: 0x0000...0x001F Channel of the mixer
On: 1 Switch on / 0 Switch off

8.10.3.4 Set Fader Level “SETFADER”

Set fader to given level.

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000103	4/7	ChannelHi	ChannelLo	LevelHi	LevelLo	TimeHi	TimeLo	Type	

Table 39:

Channel:	0x0000...0x001F	Channel of the mixer
Level:	0x8000...0x7FFF	-327, 68dB..327, 67dB
Time:	0x0000...0x2000	Time in ms
Type:	0	level linear fade
	1	fader linear fade

If the block length is set to 4, the information on time is ignored and the level is set instantly.

8.10.3.5 Set Monitor level “SETMONITORLEVEL”

The potentiometer Pot is set to level.

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000110	4/7	ChannelHi	ChannelLo	LevelHi	LevelLo	TimeHi	TimeLo	Type	

Table 40:

Pot:	0x0000...0x0009	potentiometer 1...20
Level:	0x8000...0x7FFF	-327, 68dB...327, 67dB
Time:	0x0000...0x2000	Time in ms
Type:	0	level linear fade
	1	fader linear fade

If the block length is set to 4, the information on time is ignored and the level is set instantly. The potentiometers 1 and 2 are physically there (Monitor/Headphone). The potentiometers 2..20 can be accessed only via special keys on the central control desk.

8.10.3.6 Set inputs of the logic functions “SETLOGICINPUT”

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x000010E	3	NumberHi	NumberLo	On					

Table 41:

Number:	Address of the logic function according to table
On:	1 on

0..48	Keys on the main operating panel
49..80	fader start independent of fader start level and source (channel only)
81..296	216 input-related remote starts
297, 298, 299	Timer (200ms, 500ms, 1s), internal only
300..305	Monitoring active (Monitoring n!=summation1) internal only
306	PFL switched on; internal only
307..338	PFL channel 1..32 active; internal only
339	Voice/Music signalisation
340	Timer reset
341..349	Reserved for system functions
350..399	Outputs for logic functions; internal only
400..519	GPIs
520..569	Global logic functions
570..579	preparation conference
580..589	Back button of a Mix Minus channel
590..599	Special function of a Mix Minus channel
600.609	Talk button of a Mix Minus channel
610..619	PFL button of a Mix Minus channel
620..629	Channel is Off-Air
630..652	Buttons Studio Unit 1
653..675	Buttons Studio Unit 2
676..685	level detection

Table 42:

8.10.3.7 Set display labelling “SETCHDISPLAY”

The display labelling can be changed.

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000114	6	ChannelHi	ChannelLo	ASCII1	ASCII2	ASCII3	ASCII4		

Table 43:

Channel: 0x0000...0x001F Channel of the mixer

Channel: 0x8000...0x8003 Central operating panel (4 characters each)

ASCII: 0x00...0x7F Characters

Length = 2 reproduces the original text (in central operating panel: deleting one segment deletes all segments)

The labelling of the central operating panel is retained after switching the device on and off. It must be intentionally deleted. Resetting the device resets also the text to its default. Menu functions and other operating functions override the text temporarily. Changing the inputs overrides the text labels of the channels (see “SETCHANNELINPUTNR”).

8.10.3.8 Change input routing of the channels “SETCHANNELINPUTNR”

Each fader can be allocated to a new input.

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000102	3	ChannelHi	ChannelLo	InputHi	InputLo				

Table 44:

Channel: 0x0000...0x001F Channel of the mixer

Input: Input channel

200..3004 Inputs according to their numbering

For stereo channels, set Bit 13. When working with pool faders, set Bit 15. Length 0 leads to status check of the latest setting. (Answer: Number, Fader, Blocks)

8.10.3.9 Get current fader levels “GETFADERLEVEL” (from V3.79)

The fader modules returns the current values (current position of the fader, no matter if channel is on or off).

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000130	1	Module							

Table 45:

Module: 0...4 Number of the fader module

Answer:

ID	Length	D0	D1	D2	D3	D4	D5	D6	D7
0x0000130	8	Level 0 Hi	Level 0 Lo	Level 1 Hi	Level 1 Lo	Level 2 Hi	Level 2 Lo	Level 3 Hi	Level 3 Lo

Table 46:

Level: 0x8000...0x7FFF -327, 68dB...327, 67dB (dB * 100)

The channels 0...3 are the faders of a module.