Fredenstein
Professional Audio

MixCube

Operating Manual

Fredenstein MixCube

The Fredenstein MixCube is a digital controlled stereo analog mixer that may be configured as 8 channel, 16 channel, 24 channel or 32 channel. Each channel has gain control in ½ dB steps, pan control in 19 steps, mute and solo. The final mix also has gain control in ½ dB steps, balance (pan) control in 19 steps and mute. Plus there are 4 "fader groups" that can control user assigned sets of channels that has gain, mute and solo functions.

The Fredenstein MixCube is only 16cm (6.5") x 16cm x 16cm in size. The front panel includes a 11cm (4.3") 480 x 272 pixel color TFT display to show settings. There are 3 rotary encoders and 3 buttons on the front panel. One encoder is used to select the channel to be adjusted while the other two are used to adjust LEVEL and PAN, and buttons provide instant MUTE and SOLO functions. The third button is used to select the final MIX output which can then be adjusted for LEVEL, BALANCE (PAN) and MUTE. The graphics display also has a high resolution output level meter.

The MixCube features fully balanced summing amps. This helps achieve the unusually high +28 dBu maximum input and output levels and helps minimize noise and distortion. There are 4 discrete high quality op-amps used as line drivers (one for each phase x two channels). There are only effectively 2 capacitors in the signal path and no transformers

Input connectors are DSUB 25 with 8 balanced signals on each connector. They follow the AES59 standard as used originally used by Tascam and Digidesign. Output connectors are XLR3 male.

The MixCube can be remote controlled with MIDI or USB. This allows the MixCube to be controlled with standard MIDI Fader Controllers, including some low cost controllers with moving faders that shift the faders in response to changes in MixCube settings. For example an 8 channel controller can be used with a 32 channel MixCube and as you access different sets of 8 channels, the controller will shift the fader positions to represent this set of channels.

Installation:
Electrical Safety Warnings:
Do not open the enclosure, hazardous voltages are present inside!
There are no user serviceable parts inside.
Refer servicing to qualified personnel.
Do not expose this appliance to rain and moisture.
Do not block any ventilation openings. Do not install near heat sources.
Protect the power cord from being walked on or pinched. Do not defeat the safety purpose of the polarized or grounding plug and connect to a properly grounded mains socket.
According to WEEE Directive (2012/19/EU) this product must not be disposed with household waste. This product should be taken to a licensed EEE collection center for recycling.
If you need to replace the mains fuse, make sure the replacement has the same rating, 2AT (2 2 Amp) 250V, slow blow).

Up to 32 channels can be installed in the MixCube in groups of 8. Only qualified Fredenstein distributors can perform the necessary procedures to add addition boards if required. Please contact your Fredenstein dealer or distributor to arrange that upgrade, if desired.

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The main purpose of the MixCube is to facilitate mixing "outside-the box". This often seems to provide audible benefits including clearer stereo imaging and depth and sometimes extended lows and highs. The MixCube is ideal for this purpose because it provides both precision level (and pan) control and provides exact recall. This is a significant benefit of digital controlled analog and it represents a distinct advantage over conventional summing boxes.

The outstanding audio performance of the MixCube can be an perceptible advantage compared to small mixers and the majority of summing boxes with lesser measurable performance.

  The MixCube is also designed to work with moving fader MIDI controllers. Most low cost controllers can integrate easily with the mix cube and DAW to provide a compact ergonomic mixing experience. With desk space often being limited, the small size of the MixCube and the portability of a small footprint MIDI controller can make a lot of sense.
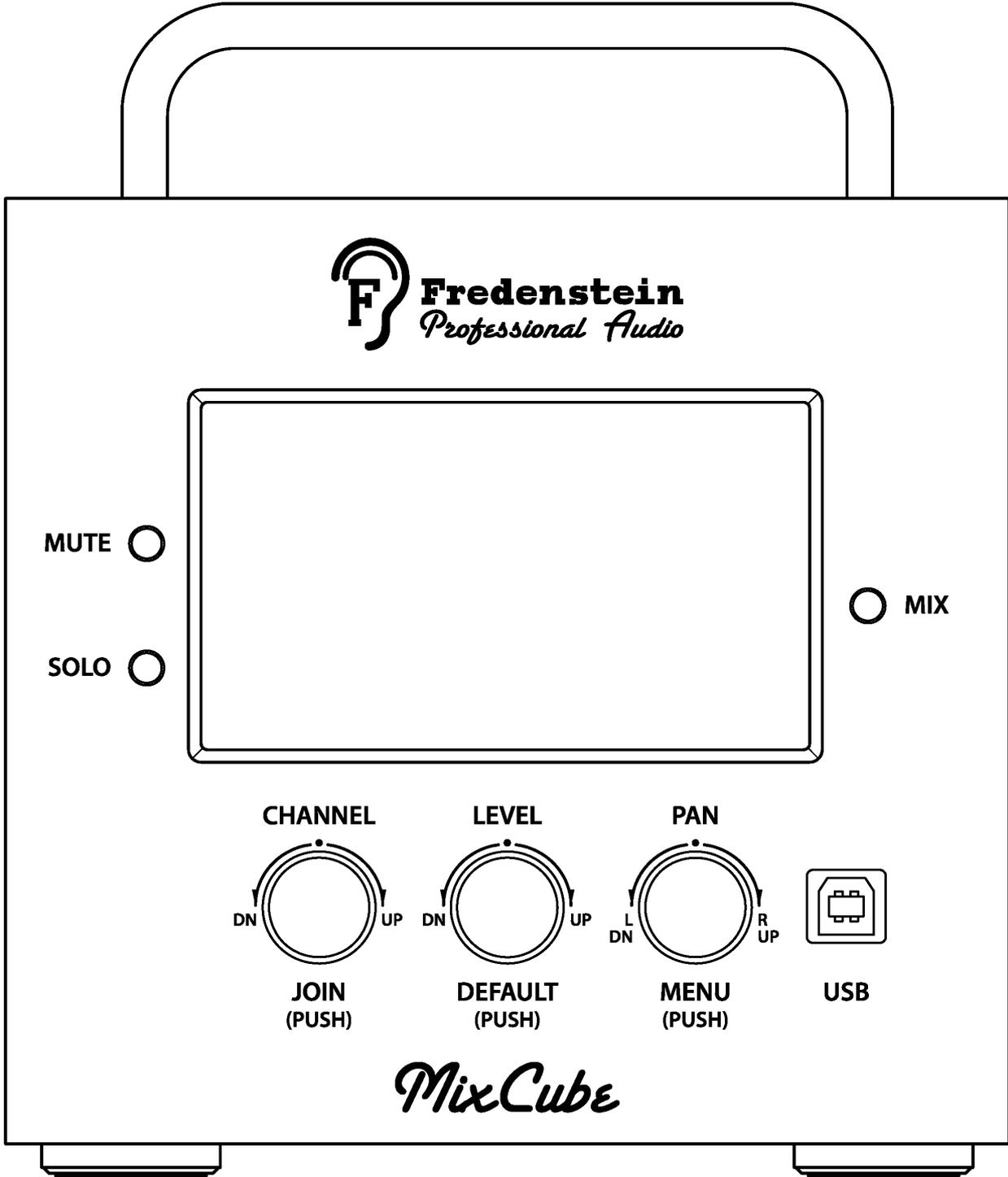
Similarly the MixCube can be used with the DAW automation. Fader moves in the digital domain can now be substituted to happen in the analog domain. You may prefer to have some tracks automated within the DAW and some tracks fed directly to the MixCube and then control those channels from spare faders in the DAW. You also may like to mix various channels to sub-groups and send those subgroups or "stems" to an outboard analog compressor and then to the MixCube, where you can continue to control that group's level with the DAW automation. This provides a way to present the analog compressor with a consistent level while still being able to creative automated level changes within the mix.

And this brings up another of the real benefits of the MixCube. You can insert any of your outboard gear between your DAC and the MixCube's inputs while still being able to control levels, pans, and mutes from the DAW post processing. Of course, you can also insert your 2 buss processing between the MixCube's outputs and ADC or stereo recording device, which may sport a premium converter set to a higher sample rate.

The MixCube includes several features intended to make life easier for the engineer.
1) You can store and recall settings into one of 9 presets. This can help when you change songs frequently, for example during overdubs. You can return to a previous mix and make some final tweaks after getting comments from the client. Presets are maintained if power is shut off as well as the last settings that you were using.
2) You can increment or decrement all fader levels at once by 3 dB or 10 dB. This can help for those of us who have experienced "fader creep" on a long mix. It is also a great feature to help find the "sweet spot" driving the mix buss or when driving an outboard compressor or processor used for adding a bit of color.
3) While a FADER BAR is selected, pushing the LEVEL knob sets that channel to zero dB of gain. This can be useful for setting up calibrated levels when a mix is migrated from in-the-box to out-of-the-box. It may also be useful.
4) Pressing the PAN (or Balance) knob cycles that channel through Left then Center then Right which is intended as a time saver to quickly set up channel positions without using the encoder to adjust in finer resolution.
5) The active fader also has a numerical display at the bottom of the screen, for when you just need to set up some gains to exact 0.5 dB values.

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MUTE

SOLO

MIX

CHANNEL   LEVEL   PAN

DN   UP   DN   UP   L   R
                      DN   UP

JOIN   DEFAULT   MENU   USB
(PUSH)   (PUSH)   (PUSH)

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Adjusting a Channel

1) Use the CHANNEL knob to select the channel that you want to adjust which is indicated on the display with the channel FADER BAR changing color to light blue or turquoise. If the MixCube is loaded with more than 8 channels, as you rotate past "8", the numbers below the FADER BARS will change to indicate the next group of eight channels.
2) Use the LEVEL knob to adjust the level. The FADER BAR will change length. The highest level is +10 dB of gain (indicated at the left side of the display) and gain is adjustable in ½ dB steps through most of the range, with some larger steps towards the bottom. There are 127 gain steps.
3) You can also push the LEVEL knob to set that channel to "zero" or unity gain. This is a fast way to set up calibrated levels.
4) Use the PAN knob to adjust the Left – Right position of that channel. This is displayed with a TRIANGLE at the right of that channels FADER BAR. Turn the knob counter-clockwise to move the sound to the left and the TRIANGLE moves up. At the right of the display, there are 3 characters; L, C and R. If a TRIANGLE is along the same line a the "C" then it is panned center. The MixCube uses the industry standard "3 dB law" which implies that a channel at unity gain and panned left or right will be unity gain at that output and if panned center will be -3 dB to both left and right.
5) Use the MUTE button to cut that channel. It is a soft mute with no pops or clicks.
6) Use the SOLO button to cut all other channels.

Adjusting the Output Mix (Master Buss) or Fader Groups

1) Press the MIX button.
2) Use the CHANNEL knob to select the MIX or one of the Groups. The selection turns blue if it is not muted or purple if muted
3) Adjust the LEVEL KNOB or MUTE or SOLO (you can not solo the Mix).
4) Press the MIX button to return to the normal mode where any of the individual channels can be adjusted.

Setting Up Groups

1) Use the CHANNEL knob to select the channel that you want to adjust which is indicated on the display with the channel FADER BAR changing color to light blue or turquoise.
2) Press the CHANNEL knob. On the display a box will form around the group LEVEL BARS indicating that the MixCube is in Group mode. Use the CHANNEL knob to assign that channel to a group or no group. The FADER BAR will change color to the corresponding color of that group and below the FADER BAR the text will indicate G1, G2, G3 or G4 or not if no group is assigned. Press the CHANNEL knob again to return to regular channel select mode. Below the CHANNEL knob there is text that reads "JOIN, (push)".

Other Mix Screen Features

1) Stereo Peak Meter with Peak Hold. This is an accurate output meter with a range from below -40 dBu to +20 dBu along with a pair of dots to indicate overload at +28 dBu.
2) 4 dots in the lower right corner that indicate how many channels are fitted. Each blue dot represents 8 channels, so 4 dots would show that this MixCube is fitted with 32 channels. Of
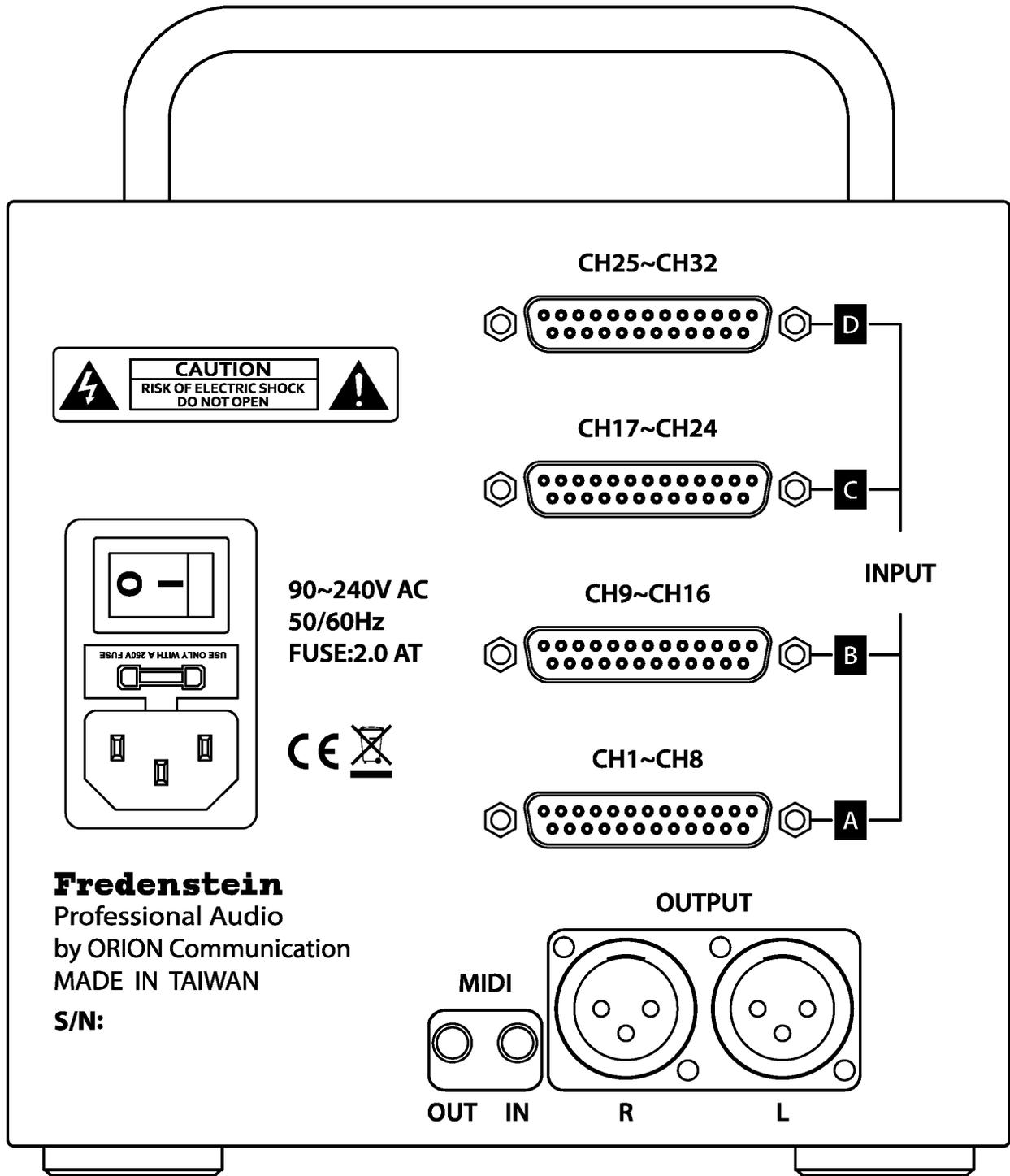
Fredenstein MixCube

course, you could look on the back panel to see how many DB25's are occupied.

3) Colors galore. The MixCube uses color to indicate several functions. Normally individual channel and mix LEVEL BARS are yellow when not muted, grey when muted and blue when selected for level and pan changes.

4) Colors are also used for 0 dB and -10 dB reference lines on the LEVEL BARS and the 0 dBu lines on the meter.

5) There are 3 additional indicators at the bottom left corner; a red dot that turns on if there is a MIDI or USB invalid message which stays red for a few seconds, then turns grey to show there had been an invalid message. There is a green dot that blinks when the MixCube stores the current settings in local memory related to bringing back settings after powering down. There is also a blue dot that indicates any MIDI or USB messages.

MENU Functions

1) Press the PAN knob. The display changes to MENU mode. Use the PAN knob to cycle through the list of functions. Select one and push the PAN knob (MENU) again to engage that function.

2) AUDIO MENU. There are 4 items that are designed as mixing conveniences. You can raise or lower the level all of the channels by 3 dB or 10 dB. This can be useful when used in combination with the Mix level to set the optimum output and possibly the best "sweet spot" that can be the result of individual channel levels hitting the buss.

3) STORE/RECALL MENU. To store a Setup, press the PAN knob (MENU) again. The display changes to highlight the number in blue. Rotate the PAN knob to select a location to store into and press the PAN knob (MENU) again. The display will indicate "DONE !" then go back to the STORE/RECALL menu. To exit, rotate the PAN knob to highlight the "EXIT" text and press the knob again, which brings you back to the Main Menu, rotate the knob to highlight the EXIT there and press the knob again to return to the Mix screen.

4) SETUP MENU. Enable USB Interface or Enable MIDI Interface. Select one or the other depending on which cables you want to control the MixCube, push the knob and the display changes to "Disable USB Interface" or " Disable MIDI Interface" so you can change back if and when you want.

5) To exit the MENU mode use the PAN knob to select "EXIT" and press the PAN knob to return to the normal mix screen.

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CH25~CH32
D

CH17~CH24
C

INPUT

CH9~CH16
B

CH1~CH8
A

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

90~240V AC
50/60Hz
FUSE:2.0 AT

USE ONLY WITH A 250V FUSE

CE

Fredenstein
Professional Audio
by ORION Communication
MADE IN TAIWAN
S/N:
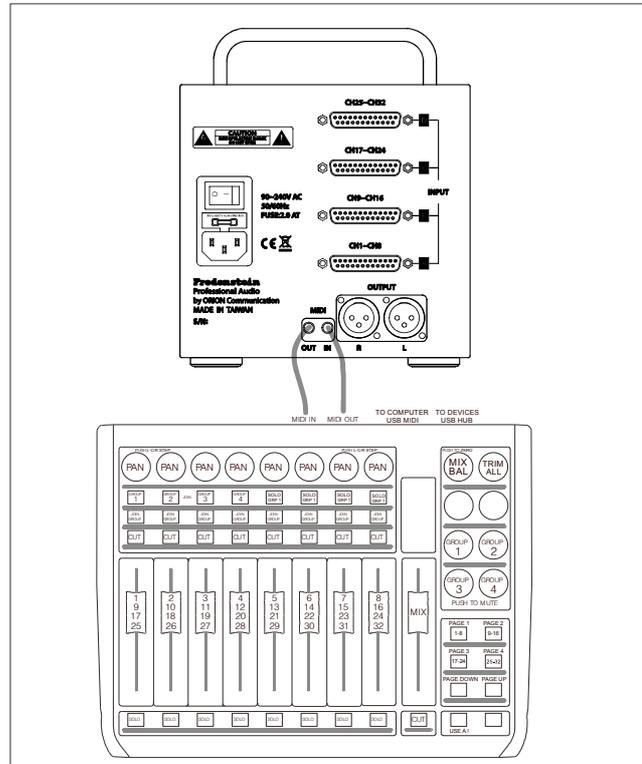
OUTPUT

MIDI

OUT   IN   R   L

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Pictured below are some of the ways one can connect the MixCube with a Behringer X-Touch Compact and a computer. Just pick one of the ways.
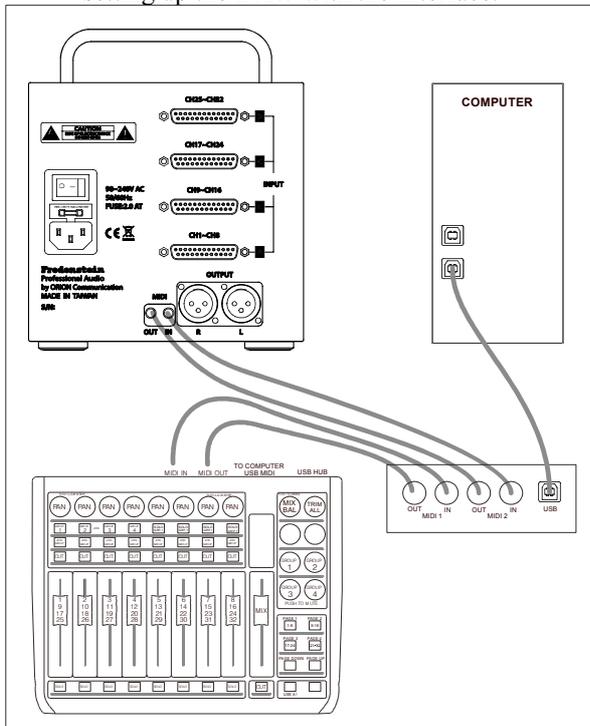
This requires the MixCube GUI and some setting up the DAW with the Controller.
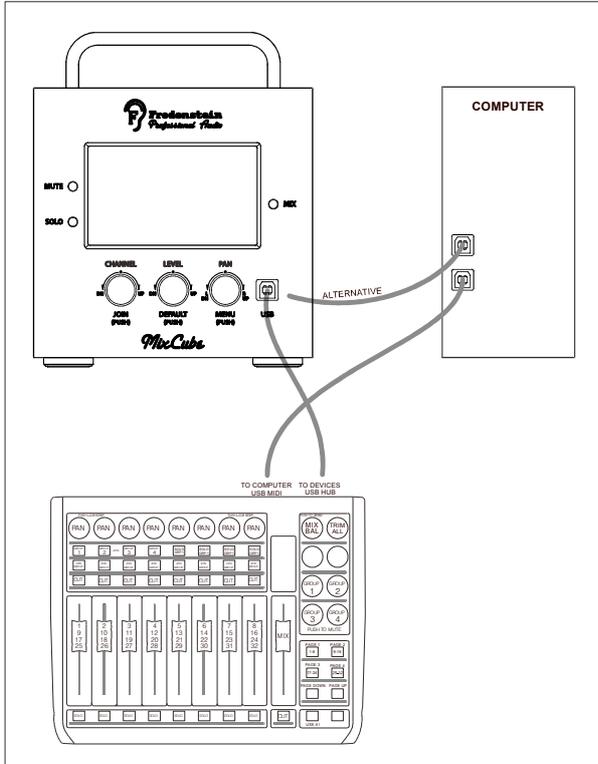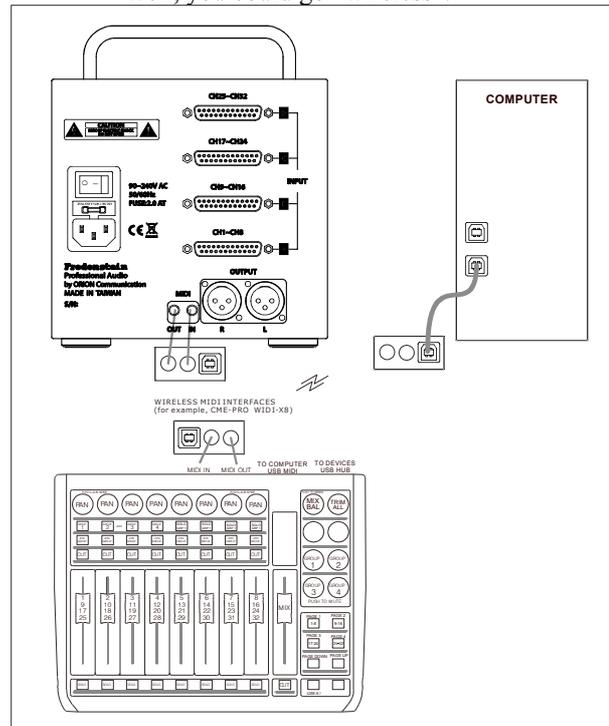
This is perhaps the easiest method.

This requires a MIDI Interface and some setting up the DAW with the Interface.
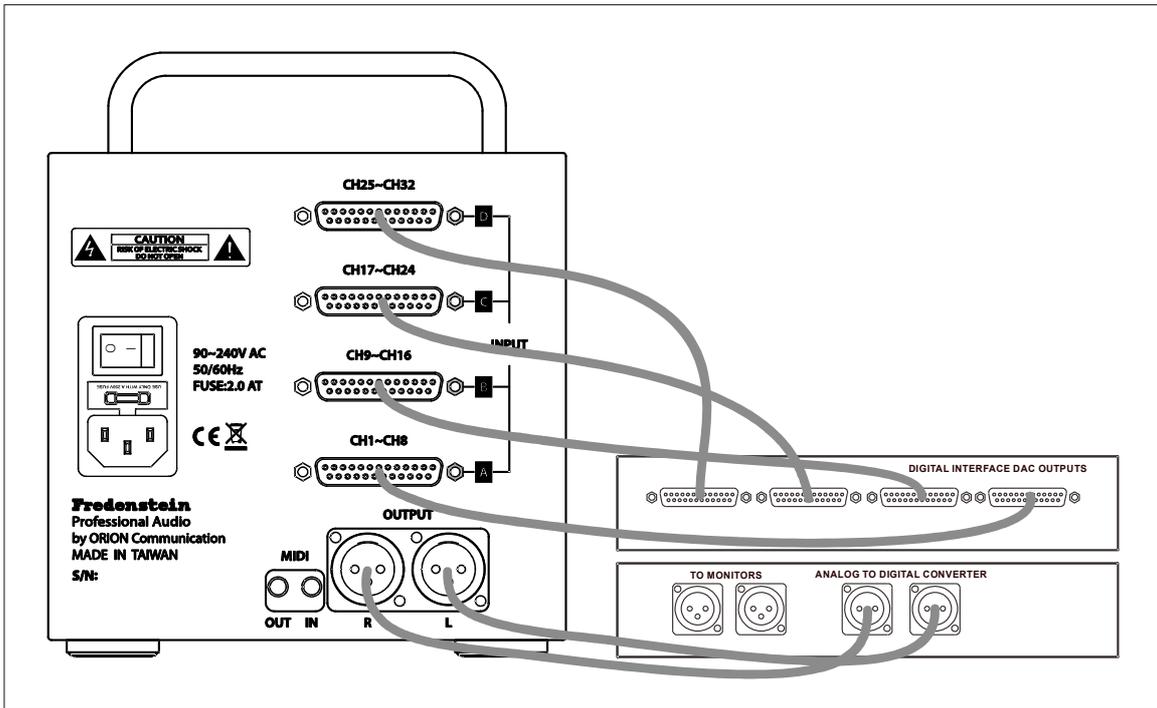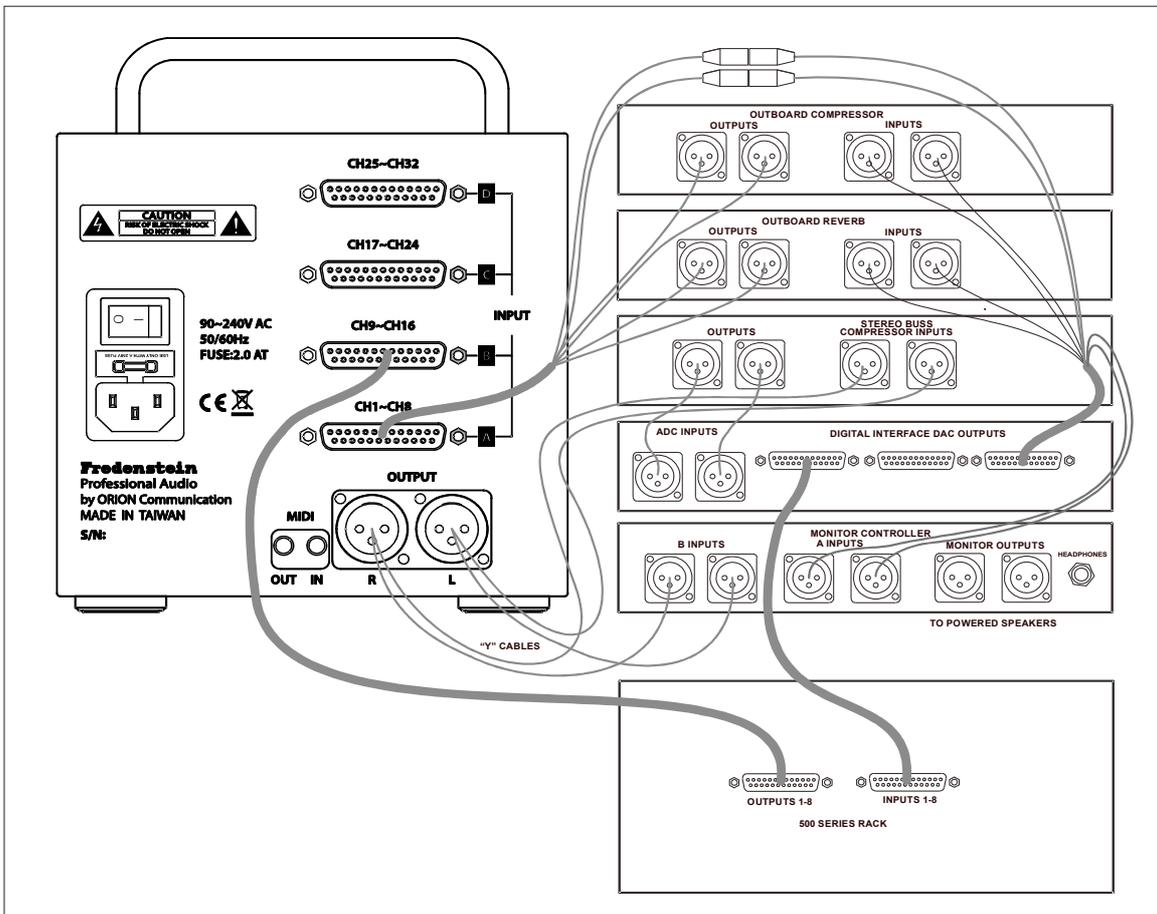
Well, you could go "wireless".

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Basic connections for 32 channels using a 32 output DAC

Showing some signal processing ideas.

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Technical Data:

Frequency Response :   2 Hz – 80,000 Hz, - 0.5 dB
                                      250,000 Hz, - 3 dB
Distortion (THD&N):   < 0.0009% at +20 dBu Output Level
           (THD)   <.0003% at +20 dBu Output Level
      (SMPTE IMD 60/7K)   < 0.0009% at +20 dBu Output Level
Signal to Noise (S/N): (Channels muted) < -100 dB at +25 dBu Output Level
    (32 Channels @ unity gain)   < -99 dB at +25 dBu Output Level
Cross-talk   (1 kHz)   < -102 dB at +20 dBu Output Level
        (10 kHz)   < -98 dB at +20 dBu Output Level
Max. Input Level   :   + 28 dBu
Max. Output Level   :   + 28 dBu
Input Impedance   :   20 kOhms (2 x 10Kohms)
Output Impedance   :   44 Ohms (2 x 22 Ohms)

MIDI jacks on the MixCube are 3.5 mm Tip-Ring-Sleeve (TRS).
Din Pin 2 = TRS Tip
Din Pin 3 = TRS Sleeve
Din Pin 4 = TRS Ring

DB25 Inputs (D-Sub 25)

DB25	Function		Function	DB25
1	In 8+		In 1 +	24
2	In 8 Gnd		In 1 -	12
3	In 7 -		In 1 Gnd	25
4	In 6 +		In 2 +	10
5	In 6 GND		In 2 -	23
6	In 5 -		In 2 Gnd	11
7	In 4 +		In 3 +	21
8	In 4 Gnd		In 3 -	9
9	In 3 -		In 3 Gnd	22
10	In 2 +		In 4 +	7
11	In 2 Gnd		In 4 -	20
12	In 1 -		In 4 Gnd	8
13	n/c		In 5 +	18
14	In 8 -		In 5 -	6
15	In 7 +		In 5 Gnd	19
16	In 7 Gnd		In 6 +	4
17	In 6 -		In 6 -	17
18	In 5 +		In 6 Gnd	5
19	In 5 Gnd		In 7 +	15
20	In 4 -		In 7 -	3
21	In 3 +		In 7 Gnd	16
22	In 3 Gnd		In 8 +	1
23	In 2 -		In 8 -	14
24	In 1 +		In 8 Gnd	2
25	In 1 Gnd			

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MIDI IMPLEMENTATION

Channel 1(9,17,25) Level	CC1	
Channel 2 Level	CC2	
Channel 3 Level	CC3	
Channel 4 Level	CC4	
Channel 5 Level	CC5	
Channel 6 Level	CC6	
Channel 7 Level	CC7	
Channel 8 Level	CC8	
MIX Level	CC9	
Channel 1(9,17,25) Touch	CC101	(can be used to select a channel)
Channel 2 Touch	CC102	
Channel 3 Touch	CC103	
Channel 4 Touch	CC104	
Channel 5 Touch	CC105	
Channel 6 Touch	CC106	
Channel 7 Touch	CC107	
Channel 8 Touch	CC108	
MIX Fader Touch	CC109	
Channel 1 (9,17,25) Pan	CC10	
Channel 2 Pan	CC11	
Channel 3 Pan	CC12	
Channel 4 Pan	CC13	
Channel 5 Pan	CC14	
Channel 6 Pan	CC15	
Channel 7 Pan	CC16	
Channel 8 Pan	CC17	
MIX Balance	CC18	
Channel 1 (etc) Pan Preset	0 (C-2)	(cycles or steps through Left-Center-Right)
Channel 2 Pan Preset	1	
Channel 3 Pan Preset	2	
Channel 4 Pan Preset	3	
Channel 5 Pan Preset	4	
Channel 6 Pan Preset	5	
Channel 7 Pan Preset	6	
Channel 8 Pan Preset	7	
MIX Balance Preset	8 (G#2)	(returns Balance to equal Left & Right)
Group 1 Level	CC22	
Group 2 Level	CC23	
Group 3 Level	CC24	
Group 4 Level	CC25	
Group 1 Cut	12 (C-1)	
Group 2 Cut	13	
Group 3 Cut	14	
Group 4 Cut	15 (D#-1)	
Channel 1 (9,17,25) Cut (Mute)	32 (G#0)	
Channel 2 Cut	33	
Channel 3 Cut	34	
Channel 4 Cut	35	
Channel 5 Cut	36	
Channel 6 Cut	37	
Channel 7 Cut	38	
Channel 8 Cut	39	
Mix Cut	48 (C2)	
Channel 1 (9,17,25) Solo	40 (E1)	
Channel 2 Solo	41	

Channel 3 Solo	42	
Channel 4 Solo	43	
Channel 5 Solo	44	
Channel 6 Solo	45	
Channel 7 Solo	46	
Channel 8 Solo	47 (B#2)	
Page 1	49 (C#2)	(channels 1-8)
Page 2	50	(channels 9-16)
Page 3	51	(channels 17-24)
Page 4	52	(channels 25-32)
Page Up	53	
Page Down	54 (F#2)	
Join Group 1	16 (E-1)	
Join Group 2	17	
Join Group 3	18	
Join Group 4	19	
Solo Group 1	20	
Solo Group 2	21	
Solo Group 3	22	
Solo Group 4	23 (B-1)	
Assign Ch 1 to Group	24 (C0)	
Assign Ch 2 to Group	25	
Assign Ch 3 to Group	26	
Assign Ch 4 to Group	27	
Assign Ch 5 to Group	28	
Assign Ch 6 to Group	29	
Assign Ch 7 to Group	30	
Assign Ch 8 to Group	31 (G0)	
Adjust all channel levels	CC19	(increments and decrements all channels by 3 dB)

NOTE: If you are using the Behringer X-Touch Compact with the MixCube, power up the Behringer X-Touch Compact first, then turn on the MixCube. This allows the MixCube to send the Behringer X-Touch Compact some instructions when the MixCube boots up. It needs to be hooked up with MIDI cables to the MixCube before hand for all this to happen sweetly. The X-Touch Compact can communicate to a computer with either USB or MIDI. It will not communicate with the MixCube directly through USB (both are slave devices, not hosts).

NOTE: This MIDI mapping works well with the Behringer X-Touch Compact. Other motorized programmable fader controllers with MIDI LEARN functionality may also work fine depending on the number of faders or rotary controls and buttons available. For those that map the MixCube to other controllers or interfaces, please take pictures and let us know about it. Maybe you want to share and be credited on our site. Its nice to have friends and admirers.

MIDI Note On and Note Off commands are used for buttons and LEDs. For example, if Channel 1 is Muted using the MixCube's Mute button, it will send a MIDI Note On with the value of 32 message. Ideally the receiving device sets the appropriate Channel 1 Mute LED on.

Another scenario; If on the MIDI controller, we push a Mute Channel 2 button, it should send a MIDI Note On (33) while the button is pushed, which toggles the mute on the MixCube channel 2. Then as the Mute button is released the controller sends a Note Off (33) command, which triggers the MixCube to send the mute status of that channel to turn on or turn off the LED on the
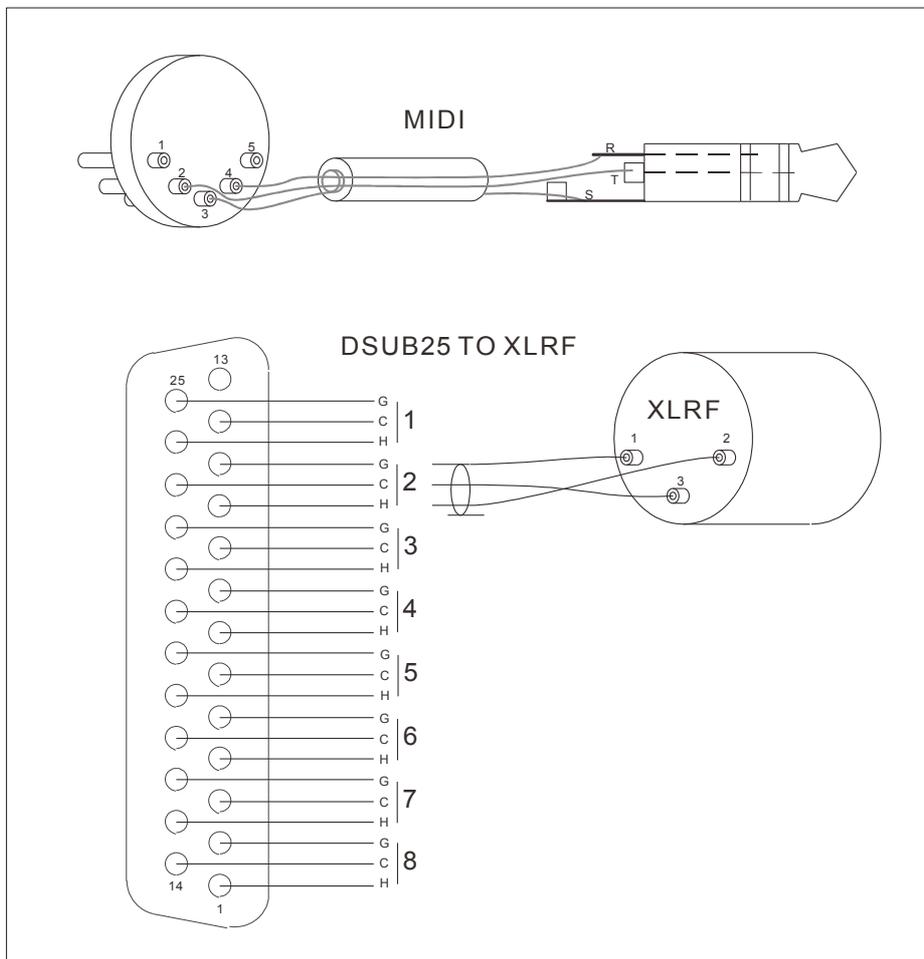
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controller's channel 2 mute button.

Remote controlled PAN; There are 19 PAN positions. MIDI controllers increment or decrement the current position. The MixCube will send CC messages to the controller mapped to the 1-127 range for the benefit of the ring-of LEDs. USB control is similar with 0 corresponding to hard left, 64 corresponding to center and 127 corresponding to hard right so that DAW based panning can be easily translated to the MixCube.

Need Dip Switch settings for:
 1-8,
9-16
17-24
25-32