Pioneer, MIDI, Digital, Ableton and YOU!

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Preamble
I decided to write this guide because I'm always getting lots of questions about how to connect gear in some fashion for some weird use, so we're going to cover all the bases hopefully answering your questions along the way.

Devices:
- DJM800
- EFX1000
- Ableton Live 5 and/or 6

Concepts:
- connecting your DJM800 as an Ableton Live MIDI controller only
- connecting your DJM800 as an Ableton Live audio device
- connecting your DJM800 as an Ableton Live MIDI controller and Ableton Live audio device
- connecting your EFX1000 as an Ableton Live controller
- connecting your EFX1000 as an effects processor for Ableton Audio
- BPM MIDI sync between devices

Basic Understanding
The fact that you're reading this guide means you have a basic understanding of your DJ gear and how to hook it all up. We're dealing with some slightly advanced stuff here and I'm going to take some liberties and make assumptions (like you know how to hook up your soundcard and/or MIDI interface and configure it within Ableton Live).

If any of this is confusing to you or beyond you, just ask and someone will try to help you out.

Requirements
I'm going to assume that you have a soundcard OTHER than your onboard desktop or laptop soundcard. Simply put, the quality sucks and you really need more than 1 pair of input and/or output plus the cabling gets stupid. Do yourself a favor and get a decent soundcard which offers you enough ins/outs for what you need now and possible future growth. You're also going to need a MIDI interface; most multiple I/O external soundcards have a MIDI I/O as well.
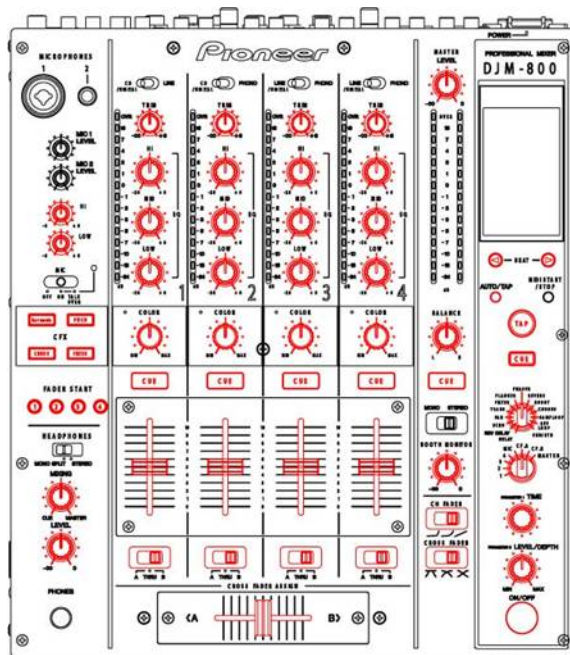
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Devices

First, let's talk about some of the hardware and software.

DJM800

The DJM800 handles MIDI out only. It has 61 points of MIDI control across the surface (red indicates a MIDI mappable control):

BPM tempo information and MIDI Start / Stop information are also transmitted down the MIDI line.

While the MIDI channel can be changed from 1-16 (so as not to interfere with other MIDI devices), each control has a fixed CC (continuous control) number, eg. CH1 Mid knob = CC03, CH4 Cross fader selection switch = CC44. While most software doesn't require you to know which control has which CC, it may be useful information for other purposes. A full listing of the DJM800's control CCs can be found in *Appendix A*.

An important note to make is that the mixer controls all perform simultaneous function! They will always send MIDI data while performing their default function on the mixer. Example: Let's say you assign the CH1 MID EQ knob to an effect in Live and you have CH1 as an audio input for your CD deck, any movement of that knob will not only send the signal to Live but also affect the MID audio of CH1. Figure out what configuration works best for you and try to avoid overlapping MIDI and audio!

There are 4 channels of digital S/PDIF coaxial inputs on the DJM800, they support one stereo-pair or mono linear PCM signals at 44.1kHz, 48kHz or 96kHz. Some digital devices (such as the Akai MPC-2500) use non-linear PCM; they are NOT compatible with the DJM800's digital input. A single S/PDIF connector will handle either mono or stereo-pair signals, you do not need more than one wire for a stereo signal.

There is 1 master stereo-pair digital S/PDIF coaxial output capable of supporting 48kHz and 96kHz sampling rates (manually switched on the rear of the mixer). Please be aware that the digital output level is -20dB which is a professional grade digital level. It's this low to avoid clipping which is quite unforgiving in the digital domain. If your soundcard or software programs don't support a digital signal boost, you may need to use analog connections.

If your audio device can't support a digital input higher than 44.1kHz, you will not be able to use the digital output from the mixer.

EFX1000

Let's start by clarifying the MIDI on the EFX. It has IN and OUT (which was mislabeled on some units as OUT/THRU; there is no THRU feature, it's just OUT). The unit operates in an IN **OR** OUT mode, not both. BPM data is always received and transmitted, no matter the switch position (yes, even in the off position).

Like the DJM800, the MIDI channel can be changed from 1-16 and each control has a fixed CC number. A full listing of the EFX1000's control CCs can be found in *Appendix B*.

The EFX1000 has 1 stereo-pair digital S/PDIF coaxial input and 1 stereo-pair digital S/PDIF coaxial output. Like the DJM800, it supports linear PCM signals at 44.1kHz, 48kHz or 96kHz (48kHz and 96kHz output only, manually switched output on the rear of the unit) and is also at -20dB pro level.

Ableton Live

Unless you've been living in a cave for the past 5 years, you know what Ableton is and because you're reading this guide, you're probably even using it or considering using it.

The MIDI configuration is quite simple largely due to the method in which you assign your controls. Simply press CTRL+M (enter MIDI Assign mode), click on whatever it is in Live you wish to assign a hardware control, then touch, turn or slide the hardware control you wish to use for that function. Live automatically grabs the CC information from that control and makes the assignment. Exit MIDI Assign (CTRL+M) and away you go! Take note that MIDI mapping is saved with the session – if you finally get a MIDI setup you like you should save it as your default template.

Everyone I've talked to about MIDI controllers and Live asks me how I've got it mapped, but it really seems to differ from DJ to DJ. I started out by mapping as much as I could to the DJM800's surface but after a while found that I preferred to have it as an audio control device instead and reduced its MIDI control down to simple track navigation and clip triggering. There is a sample template located in the package which will correspond to the mapping given in Appendix C.

I eventually got a Novation ZeRO SL controller because I wanted that extra control for when I'm running a lot of audio as well as MIDI. For an Ableton-only setup, the DJM800 works wonders because it's so intuitive.

There's a few key differences between Live 5 and 6, those which would apply to us in this guide have to do with the advancements Ableton has made in the MIDI assignment department. You can now gang MIDI assignments and have one controller perform multiple functions based on its data value, just to name two changes. Since these are more advanced functions, they may not be covered in this guide.

As mentioned earlier, I'm going to assume you know how you like things setup and have the ability to add channels. Ableton calls them "tracks" but I prefer "channels", thinking of them as channels on a mixing board. Channels are the vertical things, scenes are the horizontal things.

Concepts

It's time to get down to the nitty-gritty. Now that we're familiar with the equipment we'll be using, let's set it all up so it works properly.

Some of these are fairly simple so they're short – don't be alarmed, expecting a 110 page manual, it really is quite easy!

DJM800 as an Ableton Live MIDI controller

Get a trusty ol' MIDI cable and connect it from your MIDI output on the DJM800 to the MIDI input on your soundcard or MIDI interface.

Open Ableton Live and go into the Preferences (CTRL+,). You'll see a tab for MIDI Sync – click it. Your audio device / MIDI interface should be listed under the Input MIDI ports. Click the **Remote** button to ON. Close the preferences box and you should now be able to assign the controls in the MIDI Assign mode (CTRL+M).

If you have multiple devices listed in the Preferences but find things aren't working for you, turn off the current assignments and move down the list to the next device.

DJM800 as an Ableton Live audio device (Analog)

Don't confuse audio device with sound device which refers to your "soundcard".

There are various methods of configuring your audio within Ableton Live, some people like having each channel output its audio directly to the soundcard whereas others use the internal mixer, sending all audio to the Master before output. Since we're talking DJM800 here, we're even going to cover the 3rd method of using Ableton to receive audio so your sound device is the master output.

In the first 2 methods there is NO MIDI being covered! The DJM800 is being used for AUDIO ONLY.

Method 1: Discrete Outputs (This method requires a soundcard with multiple outputs).
Let's assume you're setup with 2 CDJs or turntables and want to add Ableton to the scene. Since you're comfortable with 2 sources, we'll use 2 channels (tracks) in Ableton to output to 2 channels on the DJM. I like using CH1 and CH4 on the mixer for CDJs and CH2 and CH3 for Ableton audio input – keeps things simple and ordered (since the laptop is above the mixer and the CDJs are on out outsides). If it helps, rename the Ableton Live channels to "DJM800 CH2" and "DJM800 CH3". You can quickly do this by double-clicking the label at the top of the channel strip and typing in the new name.

On the right side of Live's channel (track) mixer screen you'll see a little round circle with an I-O in it. Click that and you'll toggle your Input/Output assignment strip open and closed. On your Ableton channel 1, the **Audio From** should read "No Input". The **Audio To** is probably pre-set to Master, change it to "Ext. Out", below it, select "1/2". Repeat the same for Ableton's channel 2 but select "3/4". You can now close the I-O strip and click on the channel faders and press DELETE so they default to 0dB. We want the full audio going out from Ableton to the DJM.

Connect the sound device's 1/2 outputs to the DJM800's CH2 input and 3/4 to the CH3 input. You're now set to play!

Method 2: Mixed Output
This method has you setup for using the audio mixing within Ableton, sending only 1 channel of audio to the mixer. Those of you with single-output sound devices will probably want to use this method (or upgrade!). The included template uses this configuration and expects that your audio return is CH1 or CH4.

Follow the instructions as Method 1 for opening the I-O strip. Both channels should have the **Audio From** set to "No Input" and the **Audio To** set to "Master". The master channel should have the **Master Output** set to "1/2".

Connect the 1/2 output from your sound device into the DJM800's CH1 or CH4 input and you're good to go.

Method 3: Soundcard Master
In this method you're running your audio from the DJM INTO Ableton, it's a bit like Method 2 and works for those who have a 1 channel sound device or want to keep Ableton's audio out of the mixer so they can use it for MIDI control. You're going to end up reversing your connection method and will lose out on headphone cueing so that's one thing to keep in mind when choosing to setup in this fashion.

Your Ableton channels (tracks) 1 & 2 will be setup the same as Method 2, create a 3rd channel and change its **Input From** to "Ext. In" and set the box below it to "1/2", also click the monitor box for "In".

Connect your master output from the DJM800 into your input channels 1/2 on the sound device. You're now routing all your audio from the mixer into channel 3 in Ableton. You'll have to send your outputs from the sound device to your PA or recorder (whatever fills your boots).

DJM800 as an Ableton Live audio device (Digital)

Since most soundcards are equipped with one coaxial digital in and one coaxial digital out, you can use your digital in or out for any of the listed connections, keep in mind however that if you were to use your digital output

from the mixer in a scenario such as Method 3 above, the digital mixer output into Ableton will be at -20dB and there's no way to boost it in Ableton.

Most sound devices list the pair of digital ins / outs as the highest numbered connections. In my case on the FW410, they're inputs 3/4 and outputs 9/10.

DJM800 as an Ableton Live MIDI controller and audio device

Time to combine what we already learned! Since the MIDI part is secondary, we'll talk about the audio first then how the MIDI can integrate. All of these methods were discussed above, this just expands on it.

Method 1: Discrete Outputs

With the audio running through the mixer via separate channels, you won't want to assign very much on the mixer as far as Ableton audio channel controls, you're primarily looking at triggers and navigation. I suggest using the faderstart buttons as Ableton channel selectors and the cue buttons as track triggers. If you don't use a booth monitor or mic, use one of those knobs as the scene selector.

Method 2: Mixed Output

Because you've now freed up one channel on the DJM, you can use the trim, 3 EQ knobs, color effect knobs, cue button, fader and crossfader assign switch as controls for anything you want in Ableton! That's 8 new controls for you because you're using software mixing! If you don't use your crossfader for conventional mixing you could assign it to the crossfader within Ableton which would assist with the channel to channel mixing there.

Method 3: Soundcard Master

Freeing up another channel allows you to be using the CH2 and CH3 controls from the DJM as MIDI controls for both of your Ableton channels now. Less mousing is always better!

DJM800 and Ableton Live alternatives

These are not the only methods of connection and configuration – maybe you want to route your CDJs directly into the soundcard for its own channel in Ableton then run your master audio out of the soundcard directly as a master using the DJM800 exclusively as a control surface. Because of the diversity of Ableton and the DJM800 there's a lot you can do – I've even see people use one of the mic inputs for the Ableton audio input which frees up the audio on both CH2 and CH3 on the mixer for MIDI control. You get the benefit of Method 3 but still get to use the mixer for your audio.

If you come up with a new and fresh way to connect everything, by all means, please share so we can learn and perhaps adapt your method!

EFX1000 as an Ableton Live controller

Because the EFX handles MIDI in the same way as the DJM does, just connect the MIDI cable (OUT), set the switch on the top of the EFX to TRANSMIT and away you go. Configure the controls in the same was as the 800, easy as pie.

EFX1000 as an effects processor for Ableton Audio

Since the EFX1000 is such an awesome effects unit and is really easy to use because of it being hardware (YAY KNOBS AND BUTTONS!), you may want to connect it as an external device, sending audio from Ableton, through the EFX and back in.

The easiest way to do this is to first setup one Return channel (track) in Live. Add the channel, it will appear beside the master. Take its channel fader to 0dB. Open the I-O strip and assign the **Audio To** for a pair of channels you're not using, I use 7/8. Now that you're sending the audio out, you need to get it back IN.

Add a new channel (track) and label it "EFX1000". Change its **Input From** to "Ext. In" and set the box below it to "1/2", also click the monitor box for "In". Set its channel fader to 0dB as well.

You're now ready to start feeding the effector audio! Play a track on either of the other channels and turn the "Sends A" knob over to the right. Keep that channel's fader at –infinity (no audio). You should see the Return

channel meter bouncing and the EFX1000 channel meter bouncing. The LED meters on the EFX itself should be bouncing as well, you may need to adjust the input/output levels (and play with the +4/-10dB switch on the back).

If you were to take the playing track's channel fader up to 0dB, you may hear a slight "echoing". This is a delay caused by latancy in the DSPs and the input / output procedure. You can try and compensate by clicking on the round D icon to the right of the Master channel (3 below the I-O button). I've got mine adjusted to -20ms but there is still a slight delay. Not perfect, but good enough for my use.

With this configuration you're taking up the audio inputs on your sound device, so unless you've got more than 2 analog ins on your sound device, you can't use Method 3 for audio with your DJM as listed earlier.

What about digital? Yes and no. The yes is output, the no is input. Because the EFX1000 also handles its digital audio at the professional -20dB level, a digital return is useless for Ableton so configure the outputs as digital and the input as analog.

BPM MIDI sync between devices

Now that you've got all these things connected, I bet you'd like to figure out how to sync it all together so it's in time with each-other?

It doesn't really matter how you've got your audio feeds connected, or the MIDI cables for that matter since the DJM and EFX are always SENDING BPM data. If you want the EFX to receive its BPM data via MIDI and to sync to that, just press the BPM Mode button – it will cycle between Tap, Auto and MIDI. If you have the devices chained DJM > EFX > Ableton, you need to have the EFX set to MIDI or it will send whatever it reads from the audio to Ableton.

The critical part of the whole equation is telling Ableton how to sync! Open that Preferences page (CTRL+,) and go to the MIDI Sync tab. Beside your MIDI input device you'll see a **Sync** button – click it. Ableton now understands which device to listen to for a BPM signal. Close the preferences window.

You may now notice there's a little green blinking dot beside the EXT button (top left of the main window, the right end of the grey blocks where the tempo is displayed). That's your BPM but you'll notice no matter how hard you try, the BPM won't change by itself. That EXT button will help – it tells the software to start receiving the external sync.

You click it, but still nothing. You click the transport's play button but still nothing – it won't play! That's because you need one last thing … you need to tell the transport to start via MIDI. Both the DJM and EFX have a MIDI START / STOP button. Depending on how you've got it setup, press the button on whichever device is the last in the chain before Ableton. If you've got MIDI turned off on the EFX, this won't help you, you need to have it set to TRANSMIT in order to use BPM sync from the EFX.

If you have your EFX connected as an external effector for Ableton and want it to get the BPM from the software, you need to configure things in reverse. Go back into the preferences setup and find your MIDI output device and click the **Sync** there (you can disable the input Sync). Close the preferences and connect the MIDI cable from the output on the sound device to the EFX IN. You don't need to do anything else – you'll notice an orange blinking dot showing BPM sync being sent. The EFX must be set to MIDI BPM mode, it doesn't need to be in RECEIVE mode (see the switch on the top of the EFX).

I found that there was some delay with the BPM timing on the DJM800 to Live with my M-Audio FW410. I did some reading and found that if adjusted the MIDI Sync delay to -30ms, it seemed to clear up the timing issues. Your device may have a different amount of lag or latency so experiment and figure out what works best for you.

Conclusion

Hopefully you've learned enough to create your own template and really start enjoying the power of the DJM800's MIDI capabilities. One last important note – if you finally create a template you like, save it as a blank project file (with NO CLIPS loaded)! This will store all MIDI presets, audio effector banks, etc. Next time you want to use this template, load it and immediately save it as a different project. (There is a way of making it your default blank Live template; see the Ableton forums for info on this.)

Appendix A
DJM800 MIDI Table

DJM800 Control	HEX Values STATUS	DATA1	Decimal Values STATUS	DATA1	DATA2 Low	High	Range	Steps	MIDI Event
CH1 Trim	B0	01	176	01	0	7F	128	128	CC: Modulation
CH1 High	B0	02	176	02	0	7F	128	128	CC: Breath
CH1 Mid	B0	03	176	03	0	7F	128	128	Control Change
CH1 Low	B0	04	176	04	0	7F	128	128	CC: Foot Controller
CH1 Color	B0	05	176	05	0	7F	128	128	CC: Portamento Time
CH2 Trim	B0	06	176	06	0	7F	128	128	CC: Data Entry MSB
CH2 High	B0	07	176	07	0	7F	128	128	CC: Volume
CH2 Mid	B0	08	176	08	0	7F	128	128	CC: Balance
CH2 Low	B0	09	176	09	0	7F	128	128	Control Change
CH2 Color	B0	0A	176	10	0	7F	128	128	CC: PAN
Xfader	B0	0B	176	11	0	7F	128	128	CC: Expression
CH3 Trim	B0	0C	176	12	0	7F	128	128	Control Change
Time	B0	0D	176	13	0	1F	32	4096	Control Change
CH3 High	B0	0E	176	14	0	7F	128	128	Control Change
CH3 Mid	B0	0F	176	15	0	7F	128	128	Control Change
CH1 Fader	B0	11	176	17	0	7F	128	128	Control Change
CH2 Fader	B0	12	176	18	0	7F	128	128	Control Change
CH3 Fader	B0	13	176	19	0	7F	128	128	Control Change
CH4 Fader	B0	14	176	20	0	7F	128	128	Control Change
CH3 Low	B0	15	176	21	0	7F	128	128	CC: 21 (E-MU)
CH3 Color	B0	16	176	22	0	7F	128	128	CC: 22 (E-MU)
Balance	B0	17	176	23	0	7F	128	128	CC: 23 (E-MU)
Master	B0	18	176	24	0	7F	128	128	CC: 24 (E-MU)
Booth Mon	B0	19	176	25	0	7F	128	128	Control Change
Cue Level	B0	1A	176	26	0	7F	128	128	Control Change
Cue Mix	B0	1B	176	27	0	7F	128	128	Control Change
Mic High	B0	1E	176	30	0	7F	128	128	Control Change
Mic Low	B0	1F	176	31	0	7F	128	128	Control Change
Time2	B0	2D	176	45	0	7F	128	4096	Control Change
FX On/Off	B0	40	176	64	0	7F	128	2	CC: Pedal (Sustain)
CH1 XFA	B0	41	176	65	0	7F	128	3	CC: Portamento
CH2 XFA	B0	42	176	66	0	7F	128	3	CC: Sostenuto-Thumby
CH3 XFA	B0	43	176	67	0	7F	128	3	CC: Pedal-Soft
CH4 XFA	B0	44	176	68	0	7F	128	3	Control Change
Auto/Tap	B0	45	176	69	0	7F	128	2	CC: Hold 2
CH1 Cue	B0	46	176	70	0	7F	128	2	Control Change
CH2 Cue	B0	47	176	71	0	7F	128	2	CC: Harmonic Content
CH3 Cue	B0	48	176	72	0	7F	128	2	CC: Release Time
CH4 Cue	B0	49	176	73	0	7F	128	2	CC: Attack Time
Master Cue	B0	4A	176	74	0	7F	128	2	CC: Brightness
FX Cue	B0	4B	176	75	0	7F	128	2	Control Change
Beat <	B0	4C	176	76	0	7F	128	1	Control Change
Beat >	B0	4D	176	77	0	7F	128	1	Control Change
Tap	B0	4E	176	78	0	7F	128	1	Control Change
CH3 Trim	B0	50	176	80	0	7F	128	128	Control Change
CH4 High	B0	51	176	81	0	7F	128	128	Control Change
CH4 Low	B0	52	176	82	0	7F	128	128	Control Change
CH4 Color	B0	53	176	83	0	7F	128	128	Control Change
Harmonic	B0	54	176	84	0	7F	128	2	CC: Portamento Ctrl
Sweep	B0	55	176	85	0	7F	128	2	Control Change
Crush	B0	56	176	86	0	7F	128	2	Control Change
Pitch	B0	57	176	87	0	7F	128	2	Control Change
FS 1	B0	58	176	88	0	7F	128	2	Control Change
FS 2	B0	59	176	89	0	7F	128	2	Control Change
FS 3	B0	5A	176	90	0	7F	128	2	Control Change
FX Level	B0	5B	176	91	0	7F	128	128	CC: Reverb Depth
CH4 Mid	B0	5C	176	92	0	7F	128	128	CC: Tremolo Depth
FS 4	B0	5D	176	93	0	7F	128	2	CC: Chorus Depth
CH Curve	B0	5E	176	94	0	7F	128	3	CC: Celeste Depth
XF Curve	B0	5F	176	95	0	7F	128	3	CC: Phaser Depth

Notes:

Time1 and Time2 are multiplied for the maximum 4096.

1 step controls will perform 2 MIDI commands in one action - first sending their maximum, then the minimum.

Values for 2 step items: Off = 0, On = 127 (7F)

Values for 3 step items: 1 = 0, 2 = 64 (40), 3 = 127 (7F)

Range and Value numbers do not count "zero" but may use zero as the first count position in the application.

Not included are the codes for the effect selection and effect channel; please see the DJM Table on the next page.

The maroon column numbers are the CC codes.

Appendix B
DJM800 MIDI Effect Knob combinations

HEX C0 CODES

	Delay	Echo	Pan	Trans	Filter	Flanger	Phaser
FX CH1	09	11	19	21	31	29	39
FX CH2	0A	12	1A	22	32	2A	3A
FX CH3	0B	13	1B	23	33	2B	3B
FX CH4	0C	14	1C	24	34	2C	3C
FX Mic	0D	15	1D	25	35	2D	3D
FX CF-A	0E	16	1E	26	36	2E	3E
FX CF-B	0F	17	1F	27	37	2F	3F

DECIMAL 192 CODES

	Delay	Echo	Pan	Trans	Filter	Flanger	Phaser
FX CH1	09	17	25	33	49	41	57
FX CH2	10	18	26	34	50	42	58
FX CH3	11	19	27	35	51	43	59
FX CH4	12	20	28	36	52	44	60
FX Mic	13	21	29	37	53	45	61
FX CF-A	14	22	30	38	54	46	62
FX CF-B	15	23	31	39	55	47	63

Appendix C
Ableton Live 6 Sample Template Mapping

MIDI Mappings

Channel	Note/Control ▲	Path	Name	Min	Max
1	CC 6	1-DJM800 - CH2 | EQ Eight	4 Frequency A	40.0 Hz	18.5 kHz
1	CC 7	1-DJM800 - CH2 | EQ Eight	4 Resonance A	0.10	12.0
1	CC 8	1-DJM800 - CH2 | EQ Eight	1 Resonance A	0.10	12.0
1	CC 9	1-DJM800 - CH2 | EQ Eight	1 Frequency A	40.0 Hz	18.5 kHz
1	CC 10	1-DJM800 - CH2 | Mixer	S/R	-inf dB	0.00 dB
1	CC 12	2-DJM800 - CH3 | EQ Eight	4 Frequency A	40.0 Hz	18.5 kHz
1	CC 14	2-DJM800 - CH3 | EQ Eight	4 Resonance A	0.10	12.0
1	CC 15	2-DJM800 - CH3 | EQ Eight	1 Resonance A	0.10	12.0
1	CC 18	1-DJM800 - CH2 | Mixer	Track Volume	-inf dB	0.00 dB
1	CC 19	2-DJM800 - CH3 | Mixer	Track Volume	-inf dB	0.00 dB
1	CC 21	2-DJM800 - CH3 | EQ Eight	1 Frequency A	40.0 Hz	18.5 kHz
1	CC 22	2-DJM800 - CH3 | Mixer	S/R	-inf dB	0.00 dB
1	CC 25	Master	Scene Select		
1	CC 66	1-DJM800 - CH2	Clip Stop		
1	CC 67	2-DJM800 - CH3	Clip Stop		
1	CC 71	1-DJM800 - CH2	Track Launch		
1	CC 72	2-DJM800 - CH3	Track Launch		
1	CC 88	1-DJM800 - CH2	Track Status		
1	CC 89	1-DJM800 - CH2	Select Track		
1	CC 90	2-DJM800 - CH3	Select Track		
1	CC 93	2-DJM800 - CH3	Track Status		

Use the table from Appendix A to correlate the CC's above to physical controls on the DJM800.