

MINX

This system has been used for about 7 years now for many performances all over the world. It was originally built using Pure Data Extended. A Pd Vanilla version is now also available, but less thoroughly tested.

Musicians are very happy to be able to do their own mixes.

I am very happy.

It is very light (kgs), so for international touring it is.... er ... great!

1 laptop, a soundcard or 2, a 7" tablet per output

A Wi-Fi access point... and your phone or tablet for remote control.

There are of course other systems, but this is the cheapest by a mile.

It is expandable..... a lot!

It's not pretty, but it is powerful.

This version has up to 64 inputs and 64 outputs.

But 10 inputs are as much as a musician is likely to need, or use.....

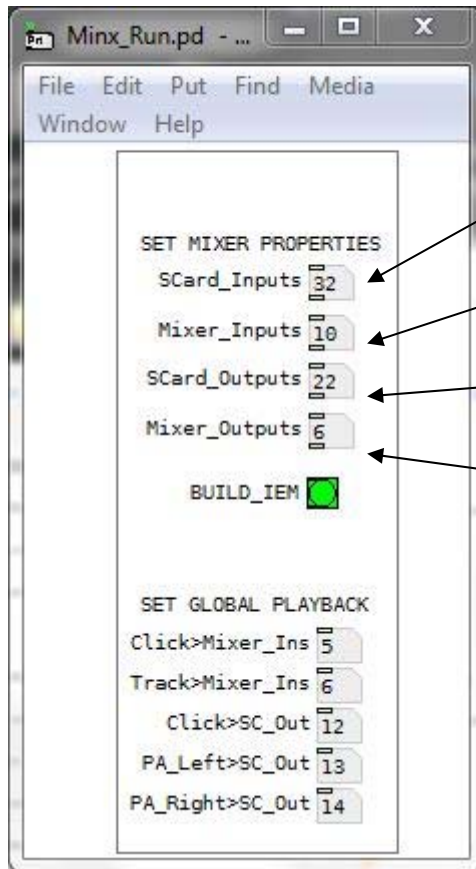
Especially as some of the inputs can be derived from sub-mixes sent from the FOH or monitor console.

Only the levels can be controlled from the tablets, and the musicians will have to ask you to change the EQ if necessary. EQ is built in to both inputs and outputs on the laptop screen, but for in-ear that is rarely necessary. And once the EQ is set you are free to concentrate on everything else you need to do.



Getting started

When you open Minx_Run.pd you will be presented with this window.....



The number of soundcard inputs available. This depends upon your Audio Settings and will be declared here.

The number of inputs for your IEM Tablets..... this system has been built for 10 faders in TouchOSC.... but you can change anything you wish.

The number of soundcard outputs available. Again, this depends upon your Audio Settings and the outputs actually available and declared.

Mixer outputs..... The number of Tablets you wish to use..... is number of output busses. You can choose a number larger than the number of actual soundcard outputs you have available but.....?

Once you have completed these settings by typing any changes that you wish to make into each number box (and pressing "enter" after each entry) you can start MINX7 with the "BUILD_IEM" button.

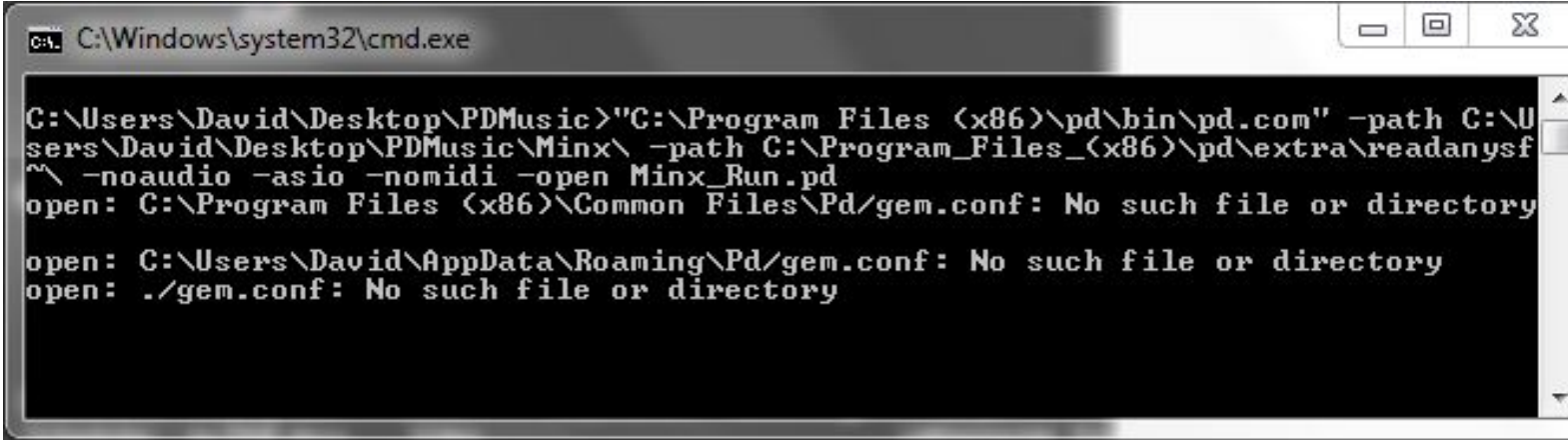
You will find all necessary files including batch files in the download.

For OSX and Linux there will be other solutions than batch files.

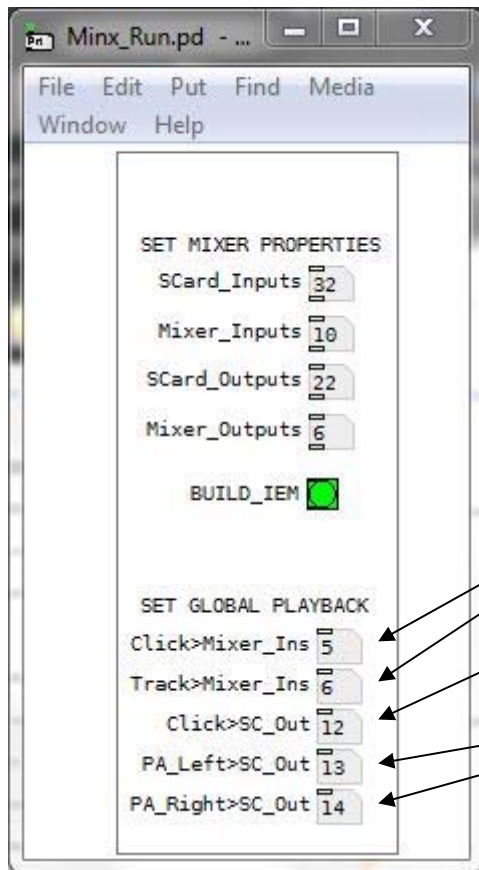
You will need to modify the batch files for your computer so that the path names are correct. The folder containing Minx is PDMusic.

If it cannot run correctly then here is an example of the batch file which I use (without audio) when working on changes to this program. The only reason that it might not run under 0.43 extended will be because of incorrect audio settings. Run "minx_run.bat" and then try to impose your system audio settings on Pure Data.

I like to use pd.com rather than pd.exe..... it is easier to kill, by closing the cmd window.

A screenshot of a Windows command prompt window. The title bar shows "C:\Windows\system32\cmd.exe". The command prompt is at the directory "C:\Users\David\Desktop\PDMusic". The user has entered a command to run "pd.com" with various flags and paths. The output shows three "open:" error messages indicating that "gem.conf" files do not exist at the specified locations.

```
C:\Users\David\Desktop\PDMusic>"C:\Program Files (x86)\pd\bin\pd.com" -path C:\Users\David\Desktop\PDMusic\Minx\ -path C:\Program Files (x86)\pd\extra\readanysf~\ -noaudio -asio -nomidi -open Minx_Run.pd
open: C:\Program Files (x86)\Common Files\Pd\gem.conf: No such file or directory
open: C:\Users\David\AppData\Roaming\Pd\gem.conf: No such file or directory
open: ./gem.conf: No such file or directory
```



My backing tracks are often one channel of music and one channel of click. They are brought into channels on inserts, after the gain. The level can be programmed and recalled dynamically as you will see later. Click on the left, or on the right track can both be accommodated.

Stereo tracks can also be used where a click is unnecessary.

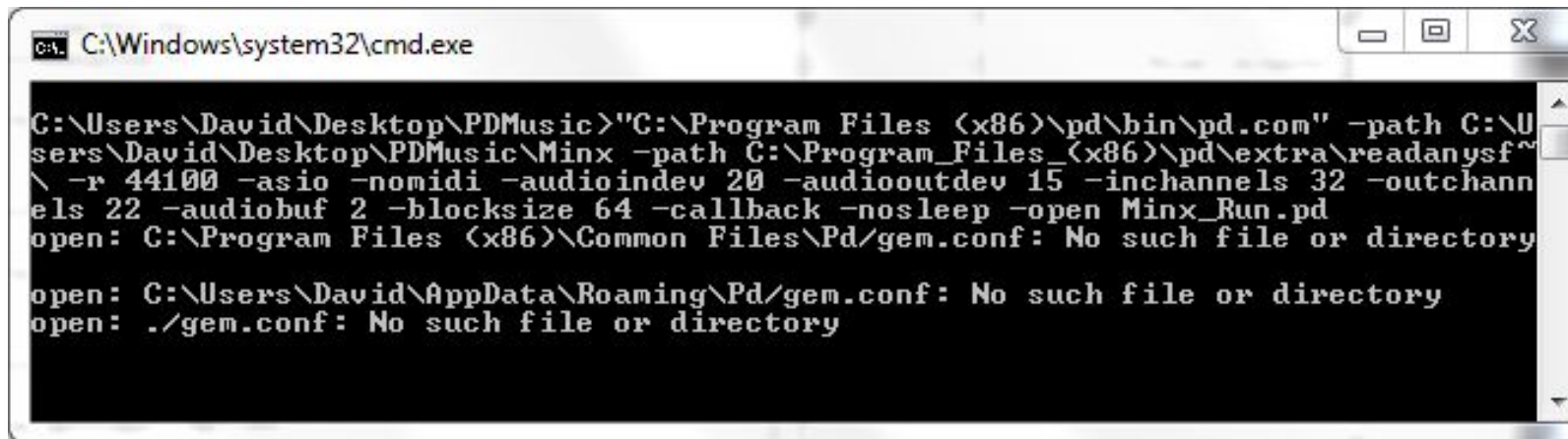
Here you set to which inputs on the tablets are connected these two tracks.

Here you decide to which discreet soundcard output you wish to send the track designated "click".

Here you select which "discreet" outputs will be used to send the Mono (to both left and right) or Stereo signal.

If you wish to change the global playback settings for the backing tracks or background music that you might wish to play then it is easier to set those parameters here before executing the build.....

Once you have all of your audio settings correct for your soundcard(s) then you can start Minx_Run.pd from the batch file "Minx_run real.bat" which should look similar to this..... but will of course have to be different for your computer.



```
C:\Windows\system32\cmd.exe

C:\Users\David\Desktop\PDMusic>"C:\Program Files (x86)\pd\bin\pd.com" -path C:\U
sers\David\Desktop\PDMusic\Minx -path C:\Program_Files_(x86)\pd\extra\readanysf~
\r 44100 -asio -nomidi -audioindev 20 -audiooutdev 15 -inchannels 32 -outchann
els 22 -audiobuf 2 -blocksize 64 -callback -nosleep -open Minx_Run.pd
open: C:\Program Files (x86)\Common Files\Pd\gem.conf: No such file or directory

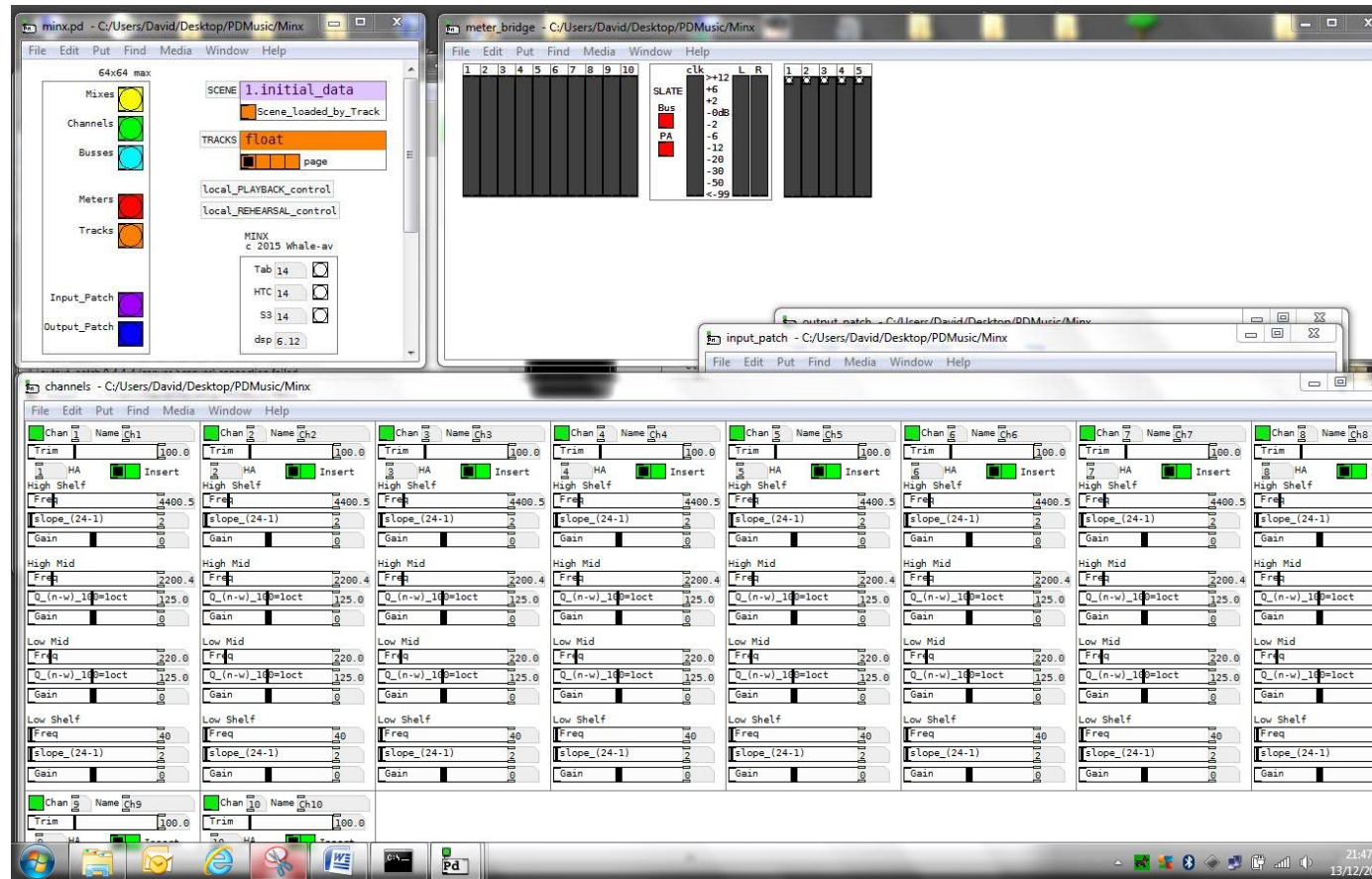
open: C:\Users\David\AppData\Roaming\Pd\gem.conf: No such file or directory
open: ./gem.conf: No such file or directory
```

.....where all of the sound parameters have been specified. This allows you to carry on learning on the same platform (using minx_run.bat) knowing that when you need to run Minx_Run.pd in anger it will run immediately without fault (if you have plugged in your soundcard!) by calling "minx_run real.bat".

Let's Go!

Press the “BUILD IEM” green button. You will see the whole mixer build from scratch on your screen.....

.....



A scene file "initial_data" has been automatically loaded. This guarantees that if you save scenes with only 5 outputs they will contain all of the cells necessary for 64 channels when you open them in your 64 channel set-up.

The 64 channel limit is due to the number of IP addresses available to Pure Data through [udpreceive] on one subnet. If you are using MINX for a triple orchestra then you will need to run multiple systems. 64x64 channels will be sl..o..w. to load and will struggle on most computers. At that point you will probably have a budget for multiple large mixing consoles..... but take binoculars (to see the musicians on the other side of the stage), and be prepared to work your socks off (running around to find out that you were wrong about the changes they requested). This system is much... much... much more relaxing.

How it Works

Well it does everything for you.

Once you have done the first initial set-up for a show then you will never touch it again. You will put down your ultra-book on a safe surface and boot it, power up your wi-fi router, put all of the \$40 (€40, £30) android tablets on stage and boot them to TouchOSC for which you only needed to buy one licence because you own all of the tablets, plug in your soundcard (ok.... a few more connections) and run MINX taking care to load the last scene that you saved and with which everyone was happy.

They are always happy. Because they have done their own mixes.

What you will have to do (usually only once)

Buy a copy of TouchOSC for Android..... <http://hexler.net/>

You could be unhappy that you already paid for the iOS version, but the software price tag will never approach the iPad / Android differential..... so you will get over it!

Set up the levels and routing.

What you will have to do during a show

Use your phone or tablet to set mixes if you have run out of tablets for the musicians..... shame.

Push buttons on your phone to select/start/pause/stop/scrub backing tracks.

If you have sensibly left your MINX ultra-book on stage (better wi-fi) then you can easily VNC into it with another.... and then you can start tracks and run rehearsals at the foh console from a "screen copy".

But often you are roaming the room when an artist asks for the next track, or a re-start at bar 134. So use your phone. You might not have a second laptop available anyway!

What you will have to do before you can start work

There are three IP addresses set up that give you access to control functions and all of the musicians mixes. The next release (minx8) will include most (or all) foh functions as well (yawn).

Fix the control devices IP addresses to 192.168.1.98 / 192.168.1.99 /192.168.1.100 sending (from touchOSC) on ports 8098 / 8099 / and 8000 respectively, and all receiving on port 9000. Add all of the templates for TouchOSC to these devices.

Set up the tablets (see the end of this manual) with their fixed IP, a copy of TouchOSC and the templates that you have modified with the names of the busses (see "Busses" below).....

First set-up

Backing Tracks

Dump any backing tracks and “walk-in” tracks in the “tracks” sub-folder in .wav format and at the sample-rate at which you are running your soundcard. Keep the names short and a single word like “Dance4.wav”.

On the tracks page put the track names (always keep them short so that they will display properly, and make sure there are no spaces in the names).

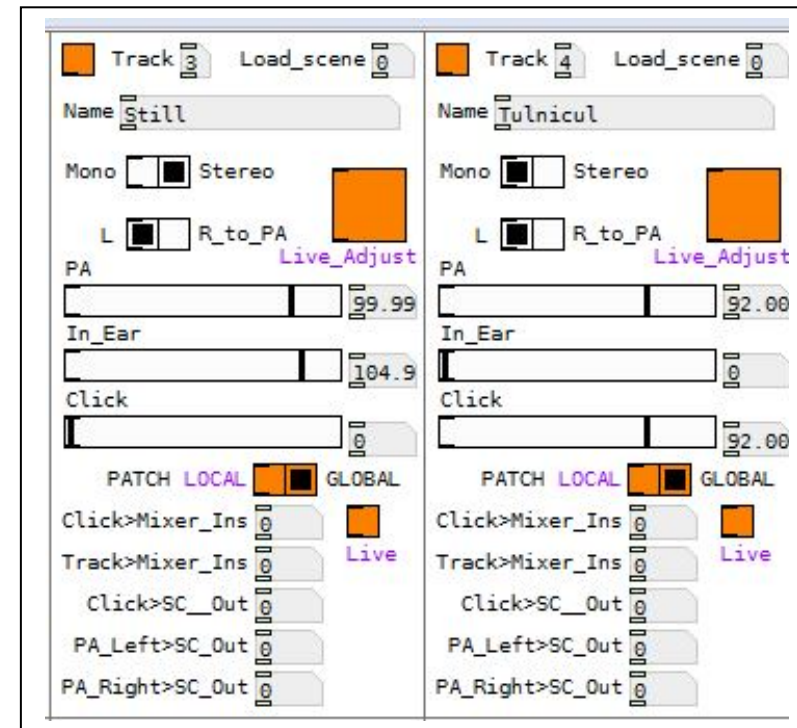
Now name, save and recall a track scene so that the player controls are updated.

To set the levels and routing for the in-ear and PA outputs, first click the “Live Adjust” button. Set everything and re-save your tracks setup.

The track number tells the track controls the order in which to show the track names, and is fixed.

The “load scene” number associates the track with a scene, and loads that scene automatically as the track starts if the “scene loaded by track” button is ticked on the main minx page. The track will start after a small (necessary) delay while the scene recall and any patching is done. If this feature is turned off a track will start instantly.

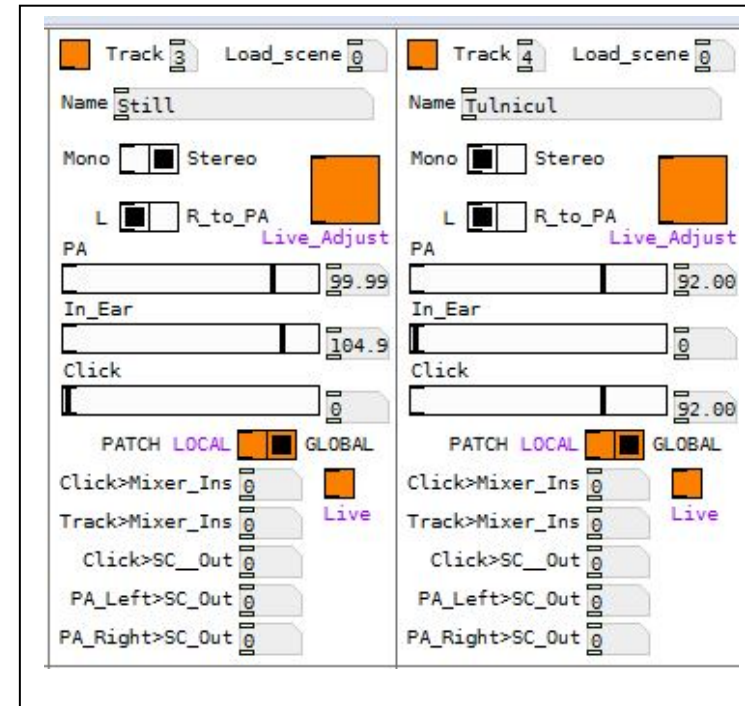
Put the track names in “Name”. The name must be the same as the track file without the extension (.wav).



If the track is stereo select Stereo. If it is mono with a click on the other track then select Mono and then the side (L or R) to send to the PA.

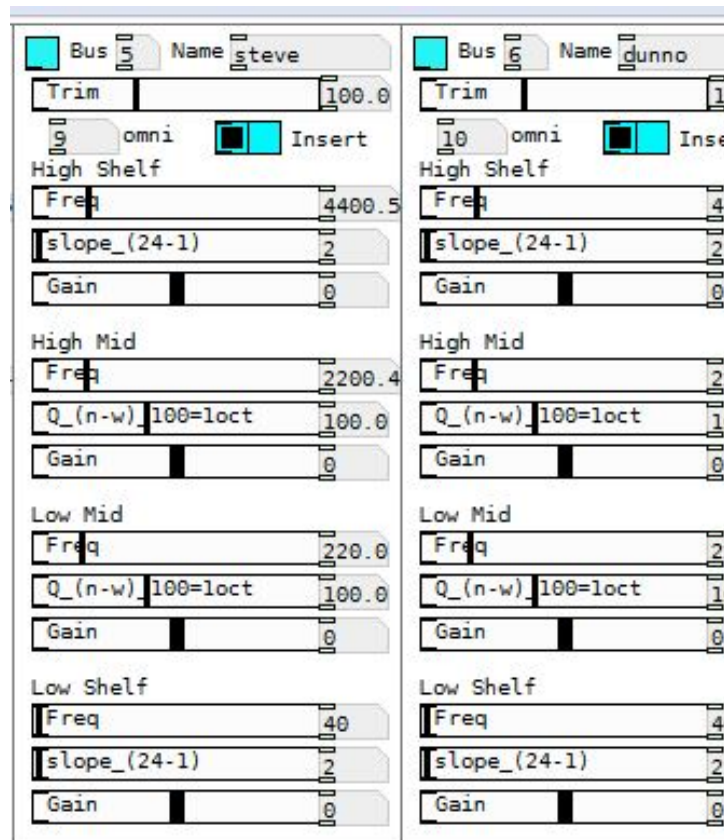
Set the levels for the PA output for this track. Set the in-ear level for the track. Set the level for the click that is also sent to the in-ear mix.

The big live adjust button allows you to change these values on the fly. They are normally locked to the last recall values.



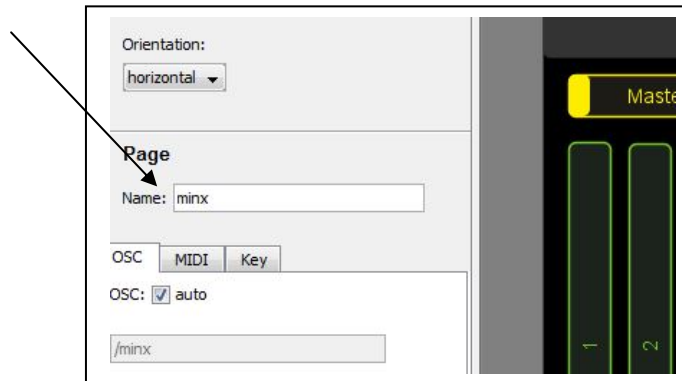
You can set a local patch for a track if you wish. I cannot think of a good reason to do so as yet. Moving faders about on the tablet during a show will probably only lead to great confusion. Once again, you can only change these values if the small "Live" button is ticked.

Busses and outputs



The bus numbers cannot be changed as they are used to index the scene file for the busses.

The Name is used in the OSC communication. Put the name you want, and then put that name as the name of the page within your TouchOsc layout for each tablet. The names must be lower case to conform with osc specifications.



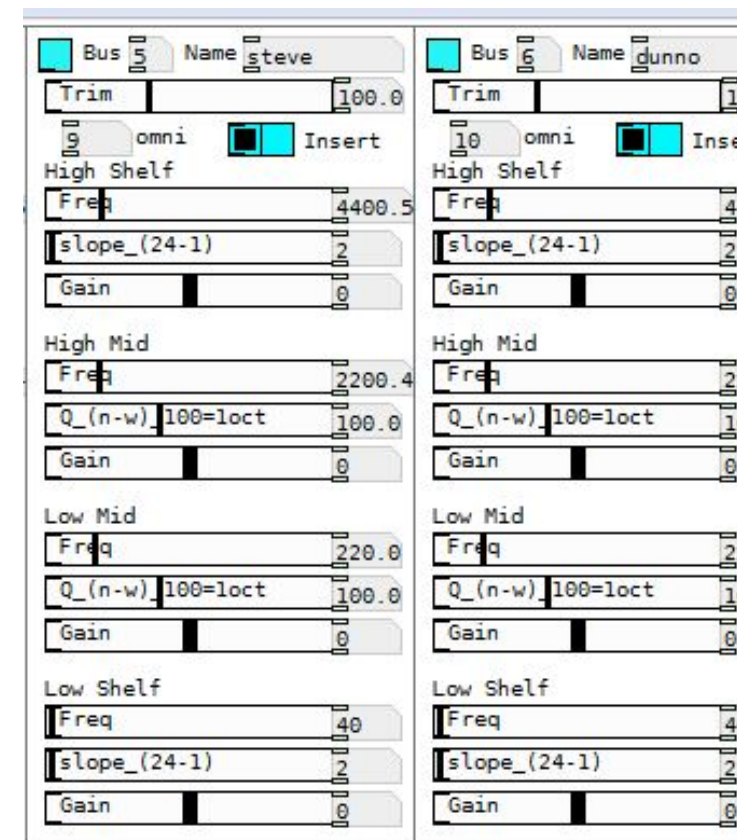
Trim the output levels if necessary

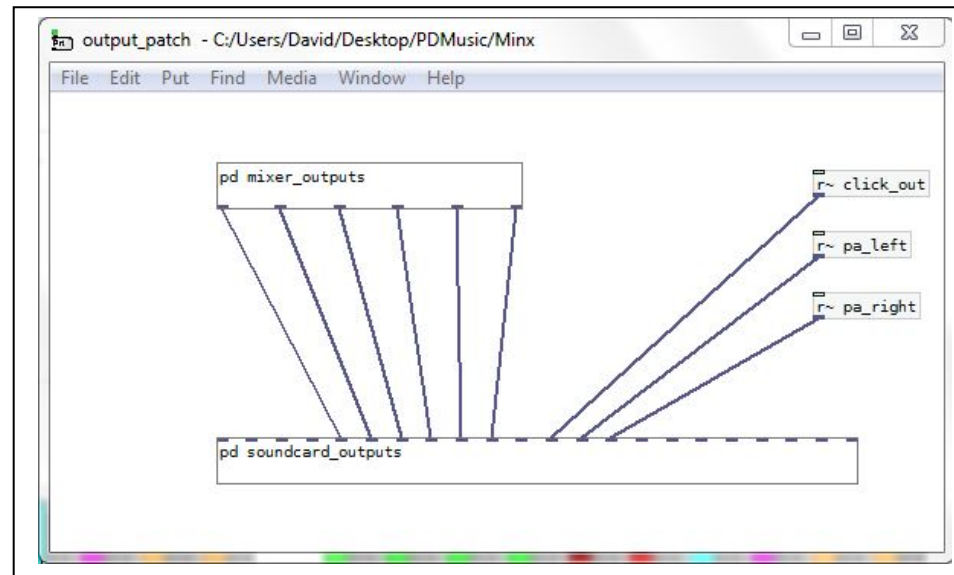
Use the slate in the meter bridge to set up the iem / wedges first:

Omni is the soundcard output number in the output patch.

The insert is not yet implemented, and might not actually make it into any version of Minx, as implementing a GEQ will be too costly for the cpu, and delay is something that we need to avoid.

Using ASIO the delay (latency) is small enough that even the violinists do not hear the difference between the instrument and the earpiece, though they are less than a foot apart.





The output patch is built as the mixer is built. It should not be "closed" although the worst that will happen will be that errors are thrown to the terminal.

The routing to the soundcard outputs is dynamically updated according to the "omni" setting in the Busses page.

The "click_out" is just the click..... it might be needed at the foh console for routing elsewhere..... it contains no "track". It was routed before the build on the first page "Minx Run".

The PA outputs, were also routed by selection on the "build mixer" page, and so they are set permanently until the next build.

The "build mixer" page saves its values as it builds and so will be "as you left it" for the next build.

Inputs

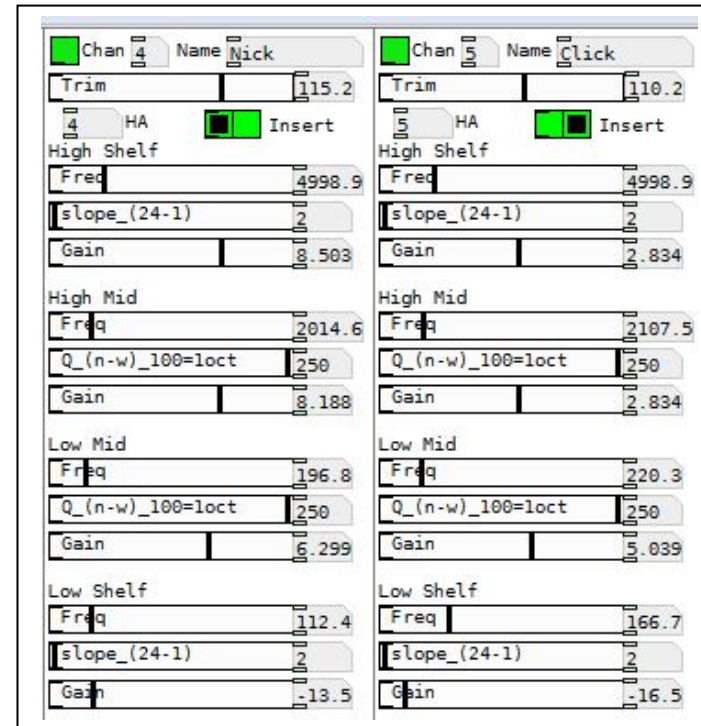
As before, and for the same reasons, the channel numbers are fixed.

Put the names of the inputs, and they will appear on the faders of the tablets.

Trim the input levels if necessary. Trim the levels on the soundcard controller first if you have that option.

The HA number is the soundcard input number and changing it will change the input patch.

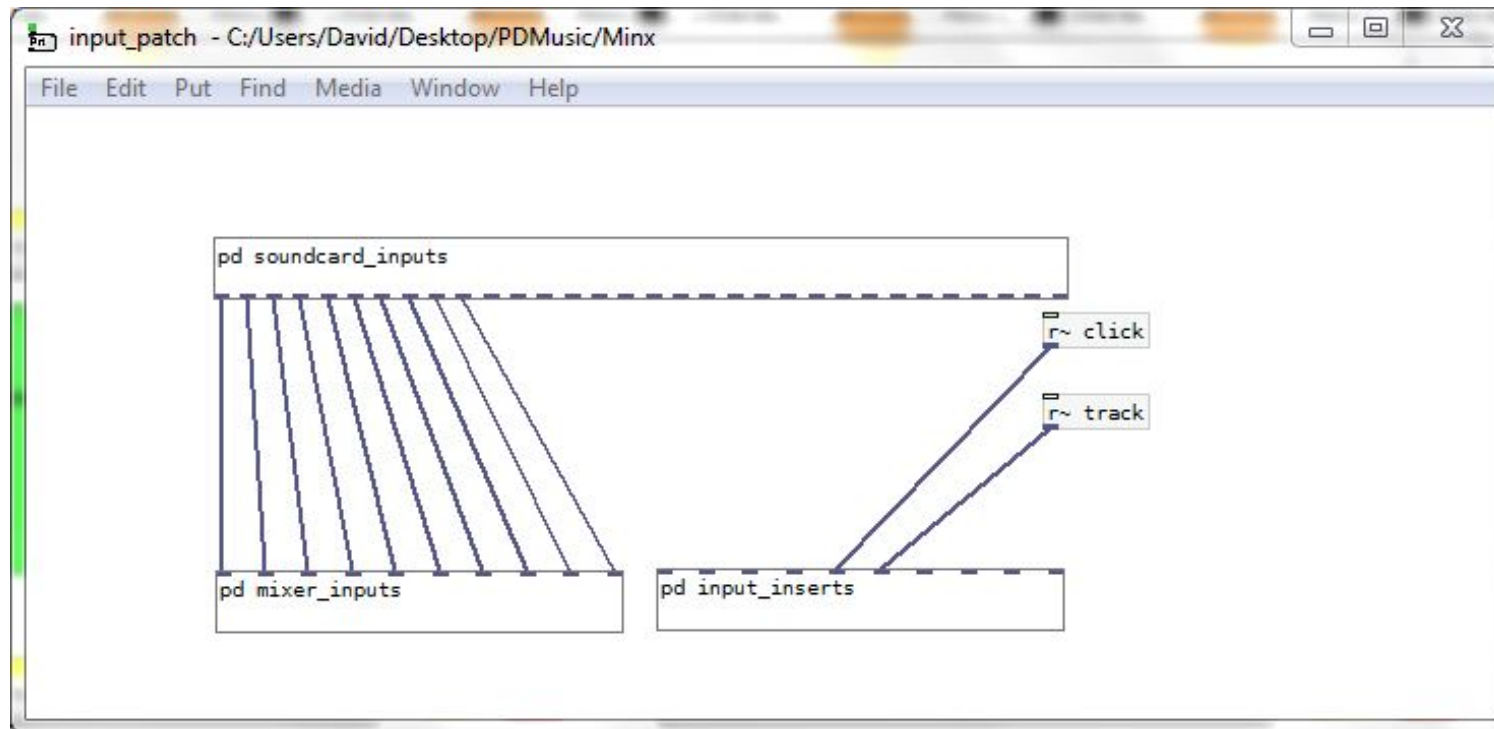
The fader and label colours can be changed by clicking the top left coloured square.



If you select the insert then the actual source will be the "input inserts" block in the input patch. The relevant soundcard input is still connected in the patch, but disconnected within the input section. So in the example above channel 5 is now connected to "click" as you can see in the "input patch" below.

Once again, the click and track inputs are assigned to the insert points as the mixer is built.

They can be dynamically changed in the Tracks page by switching to "local" for any track where patching is required.

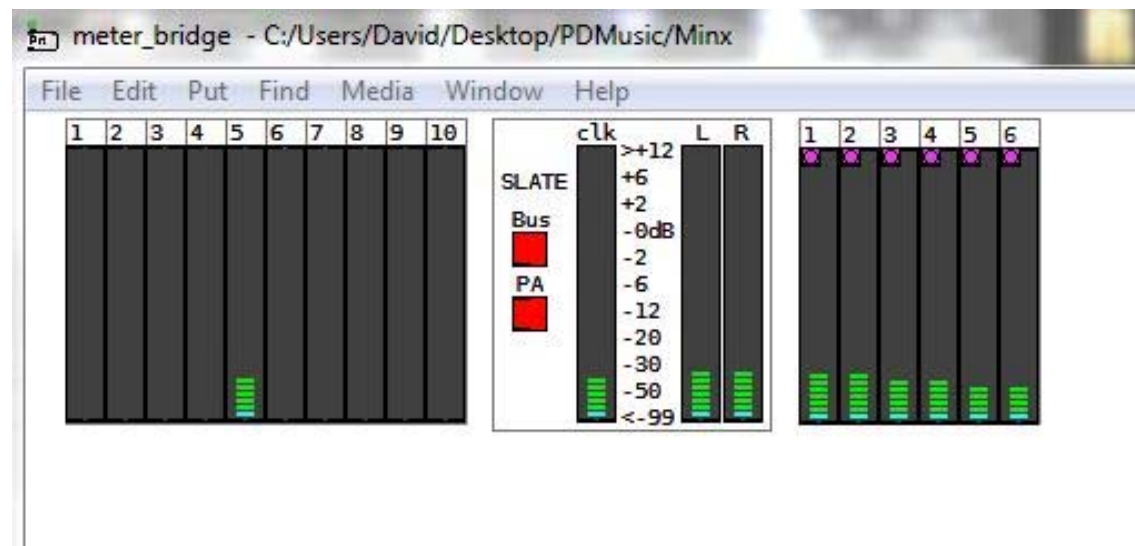


Meters

Self explanatory really..... avoid the red bars as usual.

The Bus and PA slates can be used for setup.

The little pink dots in the output meters indicate that contact has been lost with a tablet. They are white in normal operation.

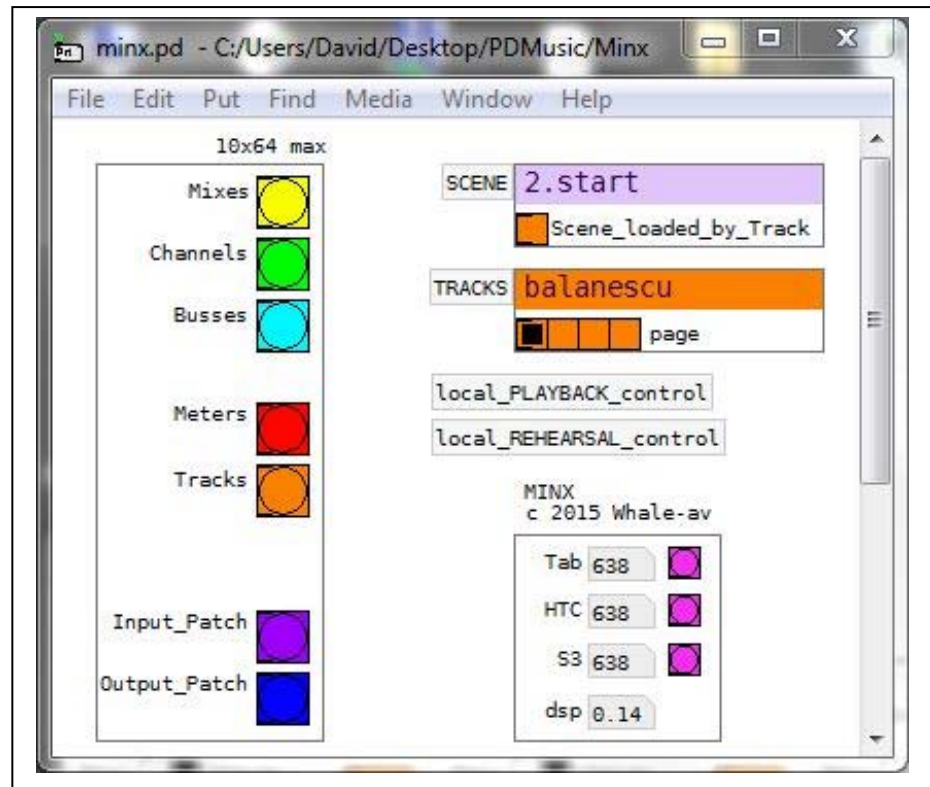


The bottom bar on an input meter indicates a noise floor, and is generally lit once a connection with the soundcard is established. An insert (usually a playback) will show nothing until a track is played (no noise).

The main "Minx window"

The buttons on the left bring the associated windows to the foreground, and bring them back if they have been accidentally closed.

If you tick the scene loaded by track button then scenes will be loaded as a track starts, but the track start will be delayed very slightly as the scene is loaded.

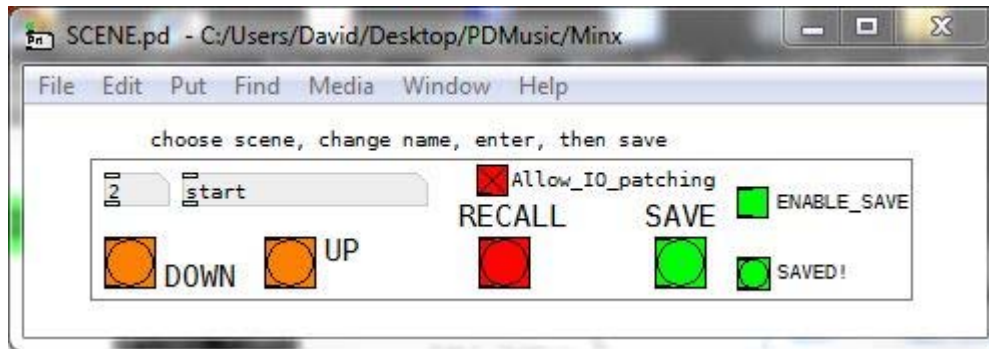


The block at the bottom right shows approximate dsp load, and just as in the meter bridge the squares are pink when a control tablet has not sent any message for more than 60 seconds, and white when all is good. The numbers indicate the number of seconds since they were last in contact. In all "TouchOSC" apps you should tick the "send ping (/ping)" on the options page.

HINT..... if the numbers are not counting every second, then your audio setup for your soundcard is incorrect, and Minx will not run properly.

If you click on SCENE you will be given the scene recall page.

Scene recall / save



Use the up/down buttons and recall or save your scene. Saves have to be enabled first, and make sure that you have moved up to a new scene number, put in a new name and pressed enter..... before you save... unless you want to overwrite the current scene. ((You will see "float" as the name of an empty scene))

None of the information that you have entered in any other page is saved until you do this!

The allow IO patching button is clicked at the first opening so as to allow patching by the initial data scene. Un-tick it if you will not need to dynamically patch any inputs or outputs as scenes are loaded.

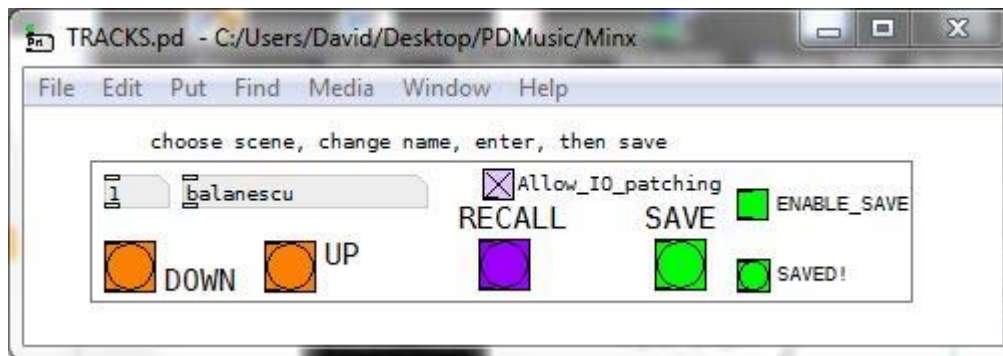
Nota: Unless IO patching is disabled in both the SCENE box and the TRACKS box (see below) playback will not be instantaneous as time is needed for the IO patching and audio needs to be muted as that happens.

Track recall / save

You can have “track scenes” as well. The above information for scenes applies.

4 pages are available per track scene. The 4 radio buttons in the main Minx window select the pages, and there are 6 tracks per page.

Click the TRACKS box to load this window.

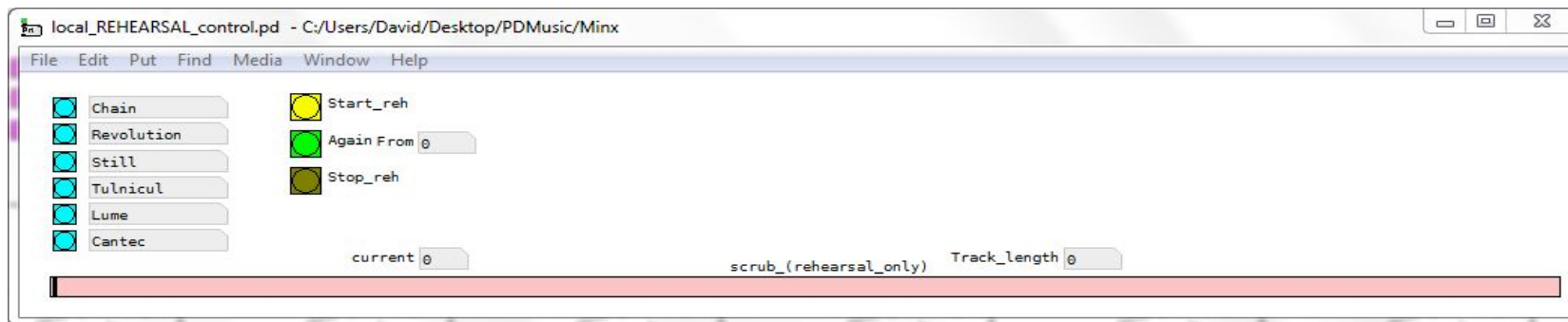
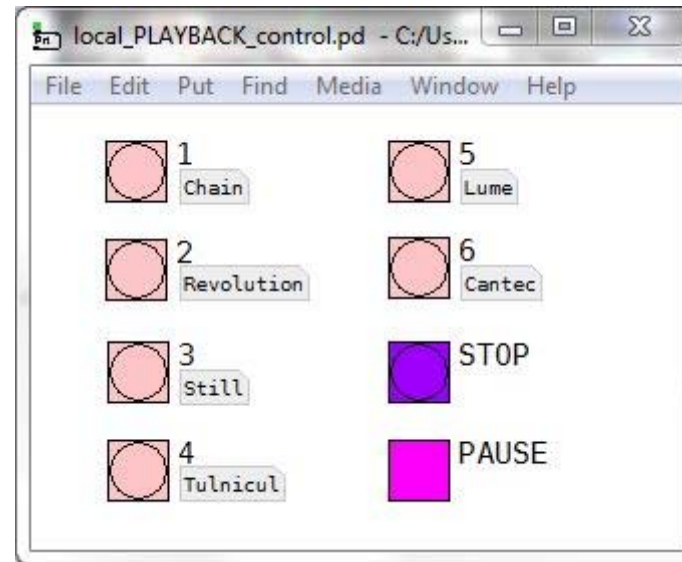


Local Playback

Local playback is instant start (unless track start is delayed by a scene recall as above).

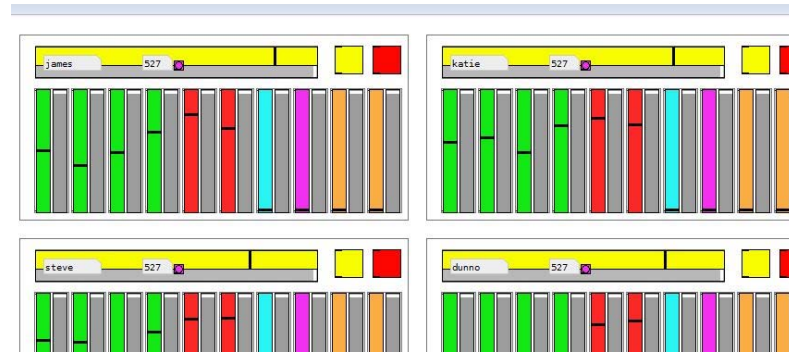
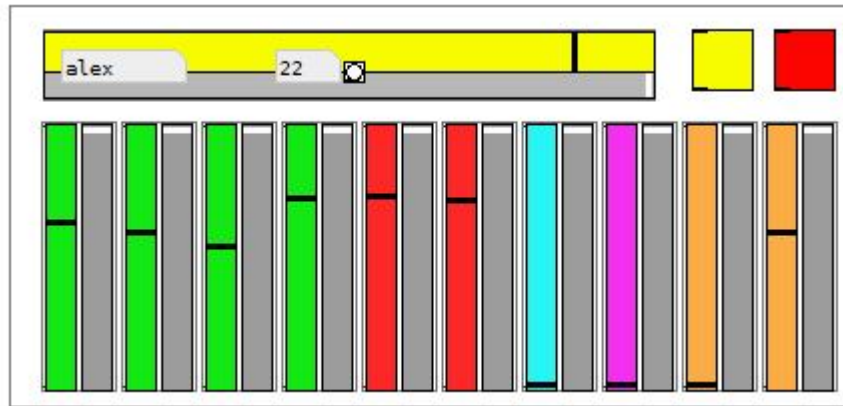
It pops up when you click "Local PLAYBACK Control" on the main Minx window.

The track pages (4 of) are updated by the radio button in the main "Minx" window, and by selecting a page on your control tablet. The track names appear in the control tablet buttons..... 6 per page.



Track rehearsal allows scrubbing from the "Local REHEARSAL Control", and on the tablet control "preset" start times can be saved while the track is playing, and then recalled.

The Mixer



The red button mutes the output. The tablets have this button as well

The yellow button mutes the audio and sends 440Hz for tuning. The tablets have this button as well. It is also useful for verifying that the tablet is talking to the correct audio output, and that there are no audio cable patching errors!

The name of the bus is shown, and sent to the tablet (even though the tablet has to know this already it then appears on the tablet and inspires confidence in the communication).

The number and the little square indicate satisfactory communication (as above). The number is the number of seconds since last contact.

The coloured faders correspond to the faders on the tablet. If you don't understand I cannot help, except that up is more, and to the right is more master volume (the yellow one).

The grey faders can be used if you are forced to give the musician control of a wedge, rather than in-ear. They will set a maximum level. On the control laptop (the screen above) you can push the levels higher, but on the tablet you cannot, and the touch faders will bounce back to the maximum you have set if the musician should try to set more volume, without the mixer ever producing more than the set maximum level.

These maximum level settings are stored with the scene, so should be added to every scene that you might need to recall. That is because the gains are also saved with the scenes. If a scene was previously saved with higher levels, and you set some "maximum levels" and re-save, those maximums will be respected on a recall of the scene.

I believe that this is the first monitor mixer to have such a facility, and I would cordially invite Yamaha, Behringer, and all console manufacturers to contribute to my retirement fund if their customers find it useful (which they should!).

If the musician asks for "more" then you are of course free to give their fader a nudge from the control laptop, but you will have a deaf musician asking for even more if you do so.

At least there should be no surprises during the performance.

The router

192.168.1.1

Powered up and running, preferably on stage, before Minx is started.

That is all.

I have mine secured by wpa-psk2 and mac address filtering. The audience just can't resist trying to connect if you give the SSID as the name of the band.

The best name is probably “honeypot” or “virus_attack” or something like that.

DHCP for the range 30-50, just in case you want to “hook in” to a device.

All tablets and control tablets are in the range 100-199 and I use 200+ for the laptops (Minx and VNC and any others)

Please don’t connect the router to the internet!

The Control Laptop (running Minx)

192.168.1.200 Fixed IP address

Plugged in and maybe charging, and close enough to the router (on stage).

The tablets (phones work too!)

The musicians control you have seen on page 1.

They will each need a copy of “minx tablet.touchosc” renamed to the name that you have given to the bus. Each tablet will need a static IP address 192.168.1.10x where x is the bus number.

You will need to edit the page name in the touchosc editor program to match the bus name. This gives a double warranty against corrupt packets.

If the tablet does not refresh (because nothing has been sent from the laptop) then tapping the “name” button will request a refresh.

Don't forget to tick the "send ping (/ping)" on the options page. It will turn the connection indicators from pink to white, and request a refresh every 60 seconds.

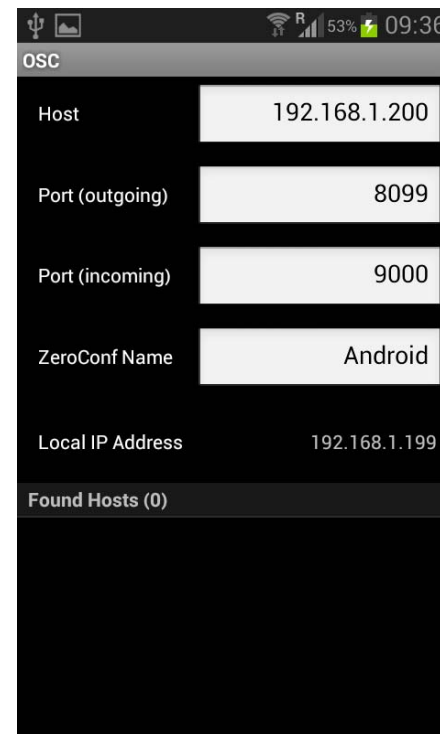
The setup page for the TouchOSC app will look like this.....

The host is the control laptop running Minx.

The port (outgoing) is 80xx where xx is the bus number. This screenshot is of one of the control tablets (198 / 199 /100).

The port (incoming) is always 9000.

The zeroconf name is for "bonjour" which is not useful here.



OSC	
Host	192.168.1.200
Port (outgoing)	8099
Port (incoming)	9000
ZeroConf Name	Android
Local IP Address	192.168.1.199
Found Hosts (0)	

The local IP address is shown, and should correspond again with the bus number assigned to each tablet..... 192.168.1.1xx... It has to be set as a static IP address for this network, in the wireless setup page of the tablet.

The Control Tablets / Phones

These can be used to “but in” and adjust any musicians tablet at the same time.

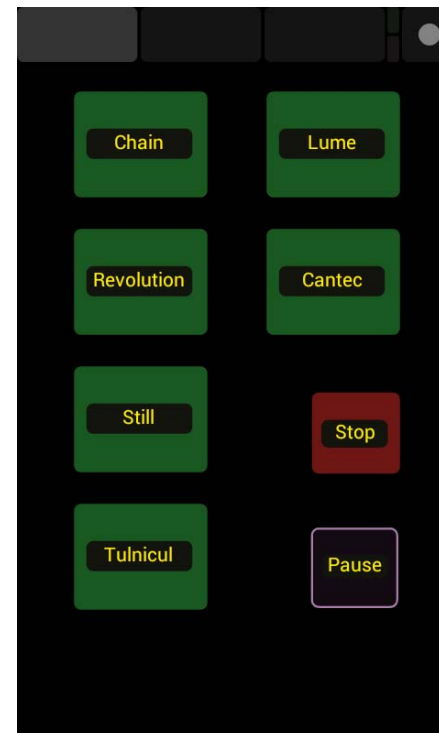
You should load all of the TouchOSC layouts that you have put on the tablets as well, which will allow you to “but in” to any of them. If some musicians do not have a tablet (you don’t have enough of them) you can still make a layout for them and put it in your control tablets. Then you (and a couple of helpers?) can move around the stage, opening the layout for a musician’s bus, and adjusting their monitor from their place on stage..... and then moving on to the next while loading the next layout.

They are also for any playback control. This whole project started from a desire to have any backing tracks played automatically to the correct channels of the FOH and monitor mixers..... at the correct levels. No more muting / panning / gain adjustment. Just tap the button!

Instant Playback

Instant playback has multiple screens to select up to 24 tracks. As you have seen there is also a (similar) local control panel in Minx. Tap a button to start a track.

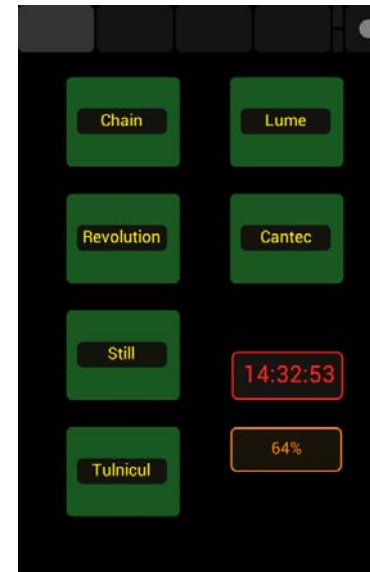
Stop and pause as required.



Rehearsal Playback

Rehearsal Playback has 2 different screens. The first 4 screens look a lot like the instant playback screen, but do not have stop and pause buttons. They select the track, but do not play it.

They tell you the time, which can be useful if you have limited rehearsal time, and how much charge you have left.



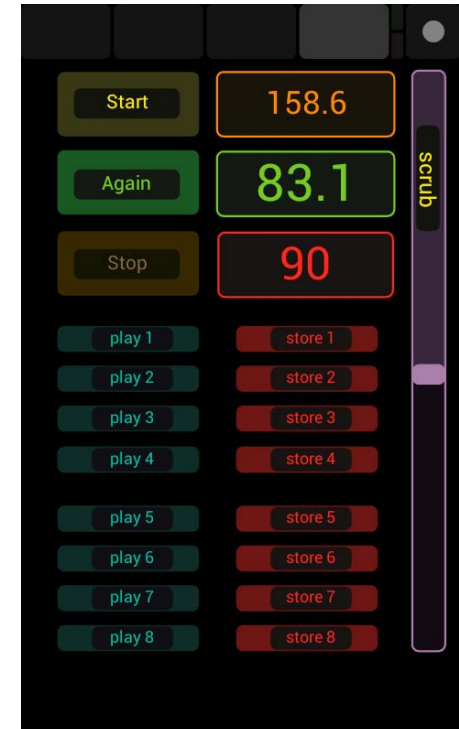
The fifth screen gives you playback control, allows scrubbing and preset play points that can be saved and recalled.

.....The screen looks like this at first opening.

And then like this when the track has started.....

You will be unable to return to the track selection screens until you press stop.

Tap "store x" while the track is playing, and then "play x" to play again from the same time it started. There are 8 preset times available, and they do not have to be "ordered".



I had never heard of Pure Data when I started this project (Jan 2013) so there will be some naff and inefficient bits!

Have fun!

I offer sincere apologies to any large heavy console manufacturers, although I doubt that their sales figures have been dented. I could not carry any of their consoles in my suitcase (although I own some, and I have tried).....

And.....

..... thank you to all who have ever had anything to do with Pure Data and its development.

I doubt very much that there will be any update before I implement the FOH mixer in Minx.

I doubt very much that there will ever be a move to improve the aesthetics or the efficiency.

Feel free to modify abstractions and patches, but if you break them you are on your own.

If you want to suggest an improvement, or to be told when any are available please open a "chat" on <http://forum.pdpatchrepo.info/>

