



Australian Technical Production Services

Soundcheck Procedure for Mackie CFX series mixers CFX12, CFX16, CFX20

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Any future updates and other notes including soundcheck procedures for other mixers may be found at : www.atps.net.

While you are under no obligation to send me any updates/improvements or corrections I would appreciate them (contact via the website).

Credits

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Soundcheck introduction

The main purpose of a Soundcheck is to ensure that the gain structure of the Sound-system is correct, this in turn ensures that the mixing desk operates at its optimum which keeps both noise and distortion in the system to a minimum and as an added bonus makes the desk easier to operate as the channel faders will be running in their optimal range.

A proper Soundcheck is one of the most critical parts of putting a good mix together and is like a Musician ensuring their instrument is in tune. So it is unfortunate that soundcheck is misunderstood and is often overlooked or not properly, carried out. This is a shame as an effective soundcheck is fairly straightforward and does not take much time to carry out.

A proper soundcheck not only makes your life easier but since it ensures the system is set up correctly, it is also of great benefit to the musicians so you need to take control and insist that you get a chance to ensure the Soundcheck is carried out correctly.

Why bother?

Each electronic stage that the signal passes through will add both distortion and noise to the signal. If the signal is too low then the noise from the electronics becomes significant, if the signal is too high then the electronics are no longer able to accurately replicate the signal and distortion becomes significant – so the trick is to try and get the signal as high above the noise as possible while still allowing a safe margin to avoid distortion.

If the Gain structure is incorrect*¹ any noise or distortion created by earlier stages will only be amplified (and made worse) by subsequent stages.

There is only one stage in the sound system that is carefully designed to cope with a very wide range of signal levels - this is the Input stage or Pre-amp in the mixing desk. In order to get the optimum performance out of the rest of the system you need to make the most of the flexibility of this stage and set the gain (Input gain, Trim) so that the signal coming out of this stage is at the optimum level.

The correct way to do this is to use the VU meters on the desk – most desks*² have a button marked either PFL or Solo (henceforth referred to as PFL) pushing this button routes the signal from that channel directly to the headphones (and in the case of PFL any control room outputs) and one of the VU meters. The optimum level for the signal from this stage is when the VU meter is running at around 0dB for a normal signal and not going into clip for a loud signal.

I have heard it claimed that the best way of checking the level on a channel is to turn all the other channels down except for the one you are checking and then adjust the gain until the signal sounds loud enough.

Not only is this completely unnecessary but **THIS IS SIMPLY WRONG!** while it may work 8 times out of 10 it is, at best subjective and there is no way of really knowing if you are running the system at its optimum or trying to make up for deficiencies elsewhere in the system.

It is always better (and takes no longer) to use the meters provided specifically for this purpose by the manufacturer of the desk.

If your channel faders all end up at some odd level after a soundcheck this may be an indication that the gain structure elsewhere in the system is not right and this can be corrected by adjusting the master faders or gain on your amplifiers.

Anyway to get on with Soundcheck....

Initial checks

Start by ensuring that Foldback sends on all the channels are off, all the channel faders are down and no channels have PFL set.

Set the subgroup and master faders (and auxiliary masters) at 0dB (unless you know the system and are aware of some other level they should be at).

Line check

Running through the channels one at a Time:

Assign the channel to the desired Subgroup (or mains).

Press PFL, ask the musician to play or the singer to sing loudly and adjust the Trim (may also be labelled gain on other consoles) until the VU meter is reading around 0dB (it will vary somewhat but as long as the peaks are still in the Green all should be well) bear in mind that singers will usually warm up so you may need to set vocal levels a bit lower to allow for this.

Set the Foldback levels for the channel so that the musicians who wish to hear that channel can do so. Since there is no one else playing, foldback levels may be rather rough at this point needing further adjustment anyway, so get them about right but do not waste too much time on them.

Push the channel fader up and (quickly) listen to the channel through the PA for any obvious problems.

Note that many people will EQ the channel also at this point while I prefer to EQ later keeping EQ minimal at this stage, there are two reasons why I do things this way:

- 1) It keeps this part of the Soundcheck shorter allowing the musicians to get on with playing together/warming up sooner
- 2) Line check is more artificial and musicians will often play/sing differently when they are on their own than when they are playing together – also EQing later allows me to listen to the instruments in context.

Clear PFL and continue on to the next channel....

Warm up and EQ

When you have set the input gain and a rough Foldback mix for all of the channels get the musicians to play through a couple of songs and let you know how Foldback is.

While they are playing: Turn the channel faders up one at a time so that you can hear each channel through Front of house and then adjust the EQ (as required).

Ideally you want to be running your faders around the middle third of their travel as gain on the lower third usually changes very abruptly and above 0dB you want to keep in reserve for 'emergency power'.

If your channel Faders all seem too low then you need to adjust the gain on your amplifiers or bring down your master fader as this is it what is for.

Alternatively if your channel faders are too high then this is most likely because the gain on the amplifier is too low – or the system you are using is inadequate for the job in hand.

Once you have EQed all the channels (or even while you are EQing them) it is a good idea to PFL all the channels again and double check the gain setting on each channel. You will often find that Vocals in particular will be louder than they were during the initial check and you may have to make some minor adjustments.

Soundcheck – Mackie CFX series

Of course any gain variation at this stage is also going to affect the Foldback levels so you will need to let the musicians know what is going on and you may need to vary Foldback settings as well.

Once Foldback, Gain and EQ have been set and the subgroups assigned, then now is a good time to start setting up the Front of House mix.

Summary:

- 1) Set subgroup and master faders at 0dB.
- 2) Assign Channel to Subgroups as required
- 3) Using PFL adjust input Gain (Trim) so the VU meter on the desk is reading around 0dB – remember you may need to allow for Vocals warming up
- 4) In consultation with the musicians on stage, adjust Foldback levels – note that for the first run through, these Foldback levels will be a starting point only and will be fine tuned later so do not spend too much time on foldback at this stage.
- 5) Listen to the channel through the front of house PA for any problems or to rough in EQ
- 6) Repeat steps 2 through 5 for all the channels in use on the desk.
- 7) With the band playing push each fader up, one at a time and listen to each channel through the Front of House system to adjust the EQ – also PFL and double check Gain/Trim.
- 8) Establish the Baseline front of house mix

While running through steps 5 to 7 keep an eye on the band to make any further adjustments to foldback that they may require

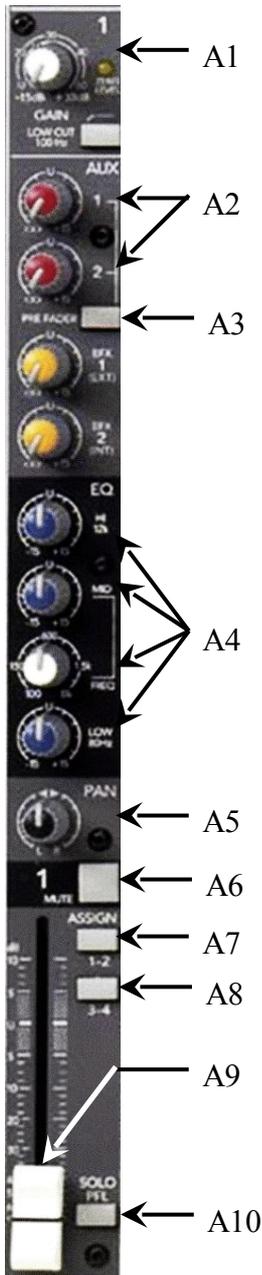
***1** Correct Gain structure is where as much of the gain as possible is in the first stages of the system with subsequent stages having either no gain or attenuating the Signal

***2** I have only stumbled across one desk without metered PFL or Solo – but I bet there are others out there. A Desk without proper PFL should be avoided as it is a bit like a car without a speedometer or fuel gauge – you can make it work but it is only going to get you into trouble.

***3** Subgroups do make maintaining the mix a lot easier, and while Subgroup allocations are entirely up to the person running the desk, I suggest (and it is only a suggestion) the following:

L-R (or M)	announcement or MC
1	Vocals
2	Instruments
3	Drums/percussion
4	Kick Drum, Floor Toms and bass instruments

Mackie CFX12, CFX16, CFX20 Soundcheck



Initial checks :

Break switch (**B5**) is up.

Phantom power on (**B3**) – if needed.

No Channels have their PFL buttons pressed, check the “Rude solo” indicator (**B6**).

Switch the Required Subgroups to Main Mix - L-R (**B7, B8**)

Set the Subgroup faders (**B9**) to 0dB

Set the Master Fader (**B10**) to 0dB (or as required).

Set the Auxiliary masters (**B2**) to ‘0’ at around 12:00 o'clock

Auxiliary/foldback sends set to pre-fade (**A3**) and sends (**A2**) zeroed (i.e. at $-\infty$) Channel faders zeroed (**A9**) (again set to $-\infty$)

Line check

Line check, Gain setting and initial Foldback setting

Run through all the channels (one at a time) and do the following:

Un-mute the channel (**A6**)

Select the PFL/SOLO (**A10**)

Get the Performer to Sing/Play then adjust the Gain Control (**A1**) so that the LED level Meter (**B4**) is around the 0dB mark - if the Singer has not warmed up yet you may have to allow a few dB for when they do.

It is important to get the Gain as close to correct as possible as once you have finished this part of the Sound check it can be very fiddly to readjust the Gain. Aim so that loud signals do not exceed +7 and Signals generally sit around 0

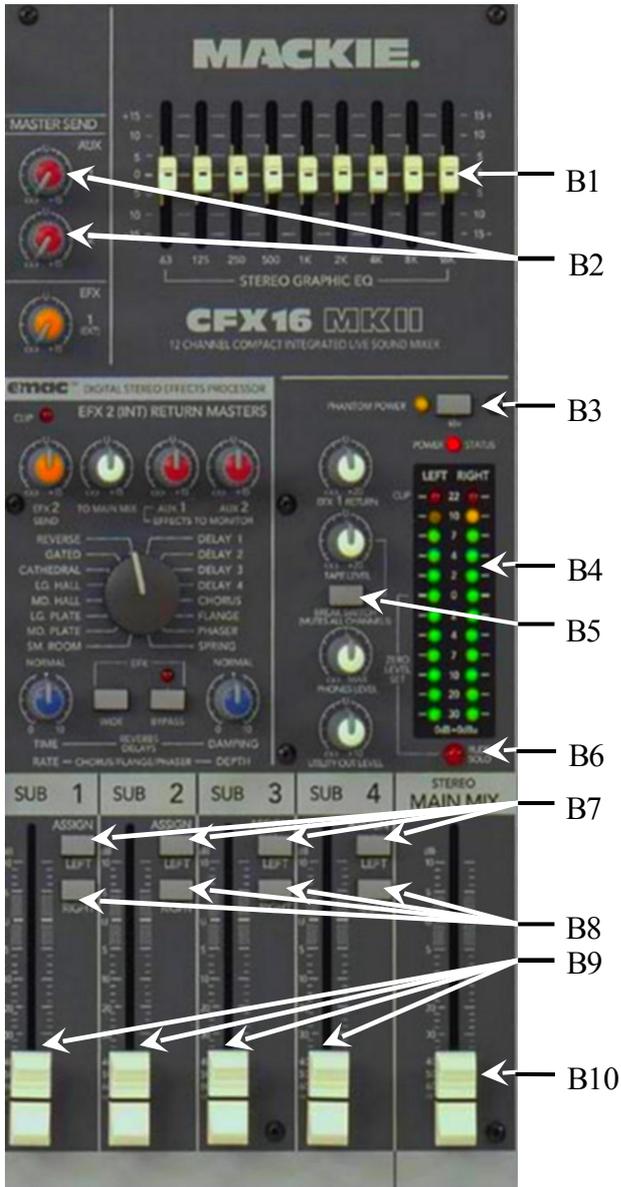
Set Foldback levels (**A2**) - bear in mind that these levels will be fine tuned during ‘warm up and EQ’ (so get it roughly right but don't waste too much time at this stage).

Push up the channel fader to have a quick listen to the channel for any obvious problems and to 'rough in' EQ, as with foldback do not spend too much time on EQ now as it is better to EQ things later 'in context' (i.e. with other channels).

Continue to the next channel and repeat as required.

Warm up and EQ

Signal Routing, EQ and Foldback check



Get the Musicians to start playing (keep an eye them in case they need any variations in Foldback) and run through the channels again one at a time:

Double Check the Input Level (**A1, A10, B4**) note any Further Variations will affect foldback so you will need to check the Musicians are still happy with Foldback if any changes are needed.

Route the channel to the required Subgroup 1-2 or 3-4 (**A7, A8**) and pan (**A5**) as needed.

Push up the channel Fader (**A9**) so you can hear the channel clearly through the Front of house speakers and adjust the EQ (**A4 / B1**) if/as needed.

Note that the Graphic provided does not have sufficient finesse for Feedback control without significantly effecting the sound so this EQ is really only adequate for shaping the sound.

Turn down the Channel and go on to the next.

When You have EQ'ed all the Channels set up the Front of House mix (**A9, B7, B8, B9, B10**)