EFFECTIVE USE OF FOLDBACK

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

- Hello
- Practices & Principles
- Live and studio overlap, share
- Backline – Room acoustics – tempo and tune
- Foldback delivers a precise mix – help perform at peak, optimum
- Effective Techniques

- 1st Technoligies

FLOOR WEDGES

Advantages	Disadvantages
Cheap	Loudness wars
Easy to use	Spill
Common	High Stage Volume

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Floor Wedges:

- Speaker on the floor
- Wedge shape
- Cheap - £100-£200 on Thomann
- Compared to IEM - ~£300 pack and £100-£900 for good earbuds
- Most common - Sound engineers know
- Disadvantages – Spill, multiple
- Loudness wars
- On stage volume - FOH

Advantages	Disadvantages
Personal mix	Expensive
Sound Isolation	Communication
Silent Rehearsals	Risk of hearing damage
More discreet	Dynamic Range

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

IEM's:
- Personal Mix
- Sound Isolation – talking requires mic.
- Silent Rehearsal – Shared space
- Expensive – moulded earbuds = £100 - £1000
- Discreet, in ears
- Lower on-stage volume
- Disadvantages - Not great bass response
- Hearing damage - Dynamic range low

HEADPHONE AMPLIFIERS

Advantages	Disadvantages
Personal mix	No/Low Spill
Can power multiple headphones	Latency due to ADC and DAC
Can provide lots of power to headphones	Impedance matching
Better Frequency Response	

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Headphone Amplifiers:
- Personal Mix
- Better frequency response than IEMs
- Two types of headphones:
- Open Back headphones – Hear room acoustics, hear people talking to you
- Closed back headphones – No/low spill
- Match impedances
- Higher impedance, more on one amp
- Less power from amp, less heat distortion
- Low impedance = better volume but more current
- Digital Conversion = latency

STUDIO MONITORS

Advantages	Disadvantages
Size of Woofer	Room acoustics
Best EQ for mixing and mastering	Expensive
	Latency

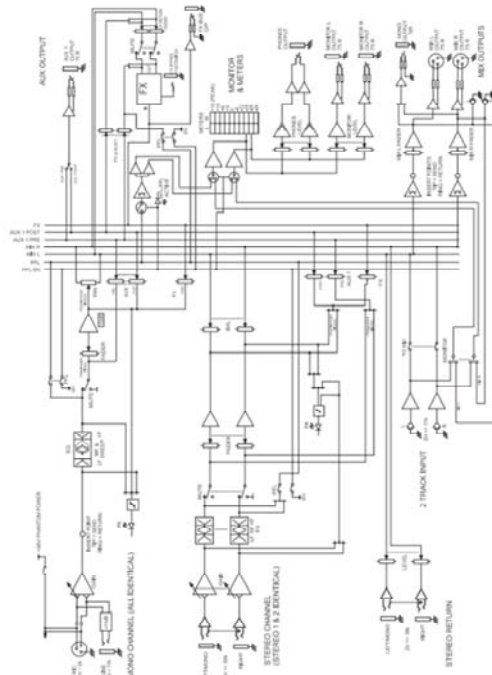| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Studio Monitors:
- Better Frequency response
- Dedicated woofer and tweeter
- Expensive – Reference, separate Sub
- Room acoustics, Placement & design of studio is important

- Going to talk about methods of mixing foldback….

AUXILIARY SENDS

‣ Bus

‣ Individual Channels

‣ Pre/Post Fade

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Auxiliary Send:

- Aux Mix, Aux bus, Aux Send
- Block diagram, this desk:
- Sent to bus, summed, output
- Individual channel mixes
- Pre/Post Fade
- Pre fade – instruments, fader doesn't change mix, only gain
- Post fade – mp3 player or laptop, fader changes mix volume & FOH

MATRIX

▶ Mix of Mixes

▶ Similar to Buses in DAW

▶ Pre Mixes for IEM's

▶ Audio Zones for Wedges

Matrix:

- Mix of Mixes
- Similar to a bus except inputs are mixes not channels
- Analogue – Allen & Heath GL2400
- Digital - Windows Interface Yamaha LS9
- Shure recommended pre mixes - 'Full Band', 'Vocal Mix', 'Tune Mix', 'Beat Mix'
- Loudspeaker management of wedges

COMPANION APPLICATIONS

▶ Better User Interface

▶ Control Surface

▶ Mix from stage

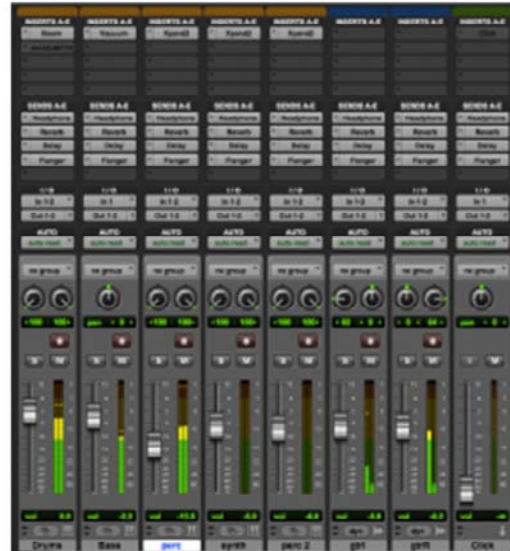▶ Performers can mix their own mix

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Stagemix:

- Same wireless network
- Different User Interface
- Control surface for desk
- Mix wedges on stage
- Talk to performers about wedges or IEM's
- Tech savvy can mix own mix from stage

DAW:

- Most flexible
- Buses, Aux mixes, Direct outs channels
- Click and drag outputs
- Easily switch between mono and stereo
- Computer's power is the limit
- Mac Pro in recording studios

- Next, considering what should be in the mix
- What makes a good mix

TEMPO

‣ Kick

‣ Click

‣ Music Direction

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Tempo:
- Something to keep Tempo
- Kick drum
- Can fall off rhythm, velocity is not consistent, can't hear
- Song could be off-beat
- Click track – digital metronome
- Always consistent
- On backing tracks, could include Music Direction

TUNE

‣ Dominant instrument
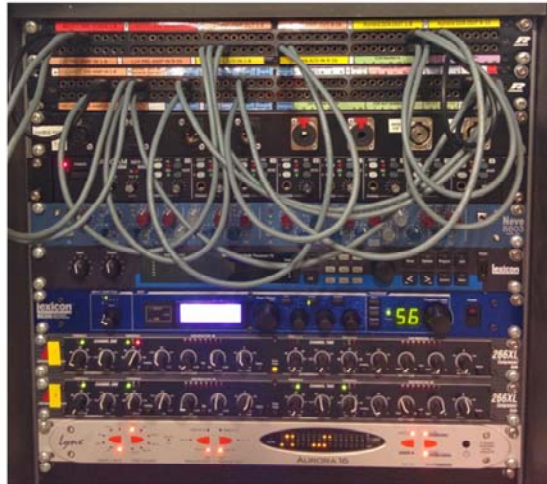
‣ Instrument that stays on tune

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |

Tune:

- Something to keep in Tune
- Dominant instrument
- Piano, Acoustic Guitar – always playing tune
- Not Electric which might be playing harmony

- Next, looking at other aspects of the mix

TALKBACK

‣ Cue Mix

‣ Ducking

‣ On top of mix

Talkback:

- Talkback aid front to back communication
- Talkback is not part of the mix, it is on top.
- Studio 2 – Mix > Cue mix (TalkBack added) > Headphone Amp/Output
- Ducking, like on radio
- Because ontop - Volume is same,
- Different pack/Wedge volumes = different volume of TB

EFFECTS

▸ Delay

▸ Reverb

Effects:
- Some performers want effects
- Don't like instantness of zero-latency, off-putting
- Delay of ~10ms to mimic speakers
- Reverb makes sound softer and fuller – easier to sing
- Masks tuning - hard to pitch

SAFETY

▶ Hearing Damage

▶ SPL

▶ Limiters

▶ Brick wall Limiters

Safety:
- Careful when mixing
- Performer's career depends on their hearing
- Wedge & IEM's at same apparent volume…
- …IEM's higher SPL because they are in ear
- Limiters – included in modern IEM's
- Can be overridden by turning pack up very loud
- Brickwall limit, limits SPL

- ▸ Different sized studios
- ▸ Different sized stages
- ▸ Personal Opinion
- ▸ Psychoacoustics
- ▸ Design of studio
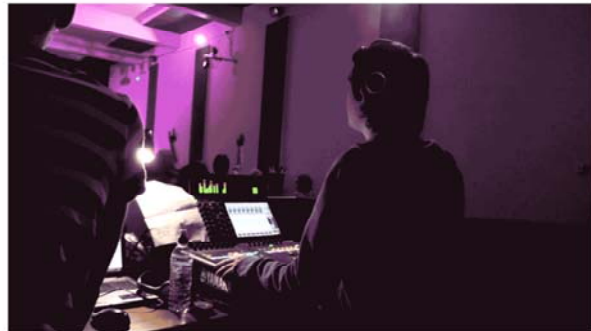
Discussion:
- Other research
- Bigger studios and stages, different acoustics
- Mixes, personal opinion – interviews
- No 'right way' to mix, however pre-defined patterns and best-practices
- Psychoacoustics, volume same on meter, different perceived volumes
- Quieter but fuller sound seems louder than loud thin sound
- Foldback considered in design process – especially for studio monitors