FORMULA SOUND

FF2.2 MIXER

USERS MANUAL

Formula Sound FF2.2 Mixer

Warranty

The FF2.2 has a 1 year parts and labour warranty under reasonable use with the exception of moving parts.

Reasonable use means operating and storage in a benign environment (0-35 degrees C and below 60% humidity, dust levels of typical home or bar /club and no contact with liquids), operating without using undue force on controls, connecting to an appropriate mains supply and connecting appropriate inputs in the power off condition. Removing screws and/or opening the FF2.2 will invalidate the warranty.

Moving parts will wear, the warranty for moving parts is 3 months, moving parts are expected to last at least 10,000 operations which typically will give 1000 hours of mixer use.
Formula Sound Limited accept no responsibility for consequential damage, please read the specification carefully and ensure any equipment that is connected to the FF2.2 or that the FF2.2 is connected to is compatible.

In the event of a defect contact Formula Sound Ltd, should your equipment need to be returned you will be responsible for the cost of the return and ensuring the equipment reaches Formula Sound Limited without damage in transit.

In the event of a defect Formula Sound Limited will investigate why the defect occurred and providing it is covered by the warranty fix that defect.

The warranty is in addition to any consumer rights you are entitled to under English law, the warranty is governed by English Law.

Should you have an issue with your FF2.2 contact us for advice by email info@formula-sound.co.uk or by telephone on (+44) 161 688 0020.

Introduction

The FF2.2 has 2 main input channels (line/phono) which are situated left and right of the mixer, additionally there is a channel 3 balanced line input (can be strapped unbalanced) and a microphone input.

Derived from the FF6.2/FF4.2 the two main input channels have many of the same features but there are also a few changes. The output section is a very stripped down version of the FF6.2/FF4.2 output section to fit in the middle of the mixer but still retaining the key features.

The channel 1 & 2 phono inputs have the ability to select 1 of 4 capacitances to best match to your deck cartridge, the phono input circuit is a 2 stage design which gives excellent vinyl sound reproduction and with switchable rumble and noise filters it would be difficult to find a better mixer for vinyl.

The FF2.2 has a remote power supply (not shown), the advantage of a remote power supply is that noise and magnetic field of the power supply are kept away from the audio resulting in a lower noise floor and better audio quality

Power Supply

The FF2.2 has an external power supply, this consists of a the power supply block and a mains cable with local style mains connector at one end and IEC style at the end that plugs into the body of the remote power supply block.

The FF2.2 has a flying cable with a 7 pin connector on the end, this 7 pin connector plugs into the remote power supply block, this connector needs to be plugged in to the mating connector on the remote power supply block and then the outer of the connector turned to screw the connector into place.

The power supply block has a IEC inlet with mains power switch, a green neon indicates when the power is on. The FF2.2 uses 3 power rails (+VE, -VE & 5V) which each have a screw in fuse, see appendix drawing for details.

The FF2.2 should be switched on and off using the switch by the IEC connector on the remote power supply block.

The Mixer has a fully regulated internal power supply that is designed to operate on 220-240Vac or 110-120Vac, a label on the outside will indicate which mains supply your remote power supply requires.

DAMAGE MAY RESULT IF THE UNIT IS CONNECTED TO THE WRONG SUPPLY VOLTAGE.

Mains fuse sizes are 800mA anti-surge for 220-240Vac and 1.5A anti-surge for 110-120Vac operation.

It is important for safety reasons that the correct fuse sizes are always used.

Master Section

Refer to appendix drawings for positions of controls, inputs and settings accessible through the base of the FF2.2. Drawings indicate positions and functions, FF2.2 may differ.

Outputs

Master and Booth outputs are available in balanced stereo on XLR connectors along with unbalanced stereo outputs for each on RCA connectors (the booth output is called record on the RCA connector).

There is also a mono output on XLR with a switch accessible through the base of the unit that allows the selection of either mono master or sub bass.

Master and booth each have volume controls on the front panel, additionally there is a booth pan pot accessible through the base together with a switch that allows the booth to be switched to mono should it be required.

Master and booth each have 12 LED stereo metering indicating output level in dB.

Channel 3 and microphone Inputs

The channel 3 (CH3) input is on balanced twin 3 pole ¼" jacks, this input goes only to the master via its volume control, the CH 3 input is given 6dB of gain.

When CH3 volume control is in middle position attenuates by 6dB so with CH3 volume control in middle position the level sent to the master is the same as the level at the input, if a higher signal is required the CH3 volume control only needs to be adjusted above mid.

Channel 3 has 2 bi-colour LED's to indicate CH3 input level, left is Green/Yellow and right is Yellow/Red.

When left green flashes slowly it indicates a signal of about -20dB and at -7dB it comes fully on. When left yellow flashes it indicates a signal of -3dB and at +1dB it comes fully on.

When right yellow comes on it indicates +4dB and when right red comes on it indicates +12dB or clip level.

There is a CUE button for CH3 allowing the user to monitor the signal pre volume control.

The microphone (MIC) input is on balanced XLR, there is a gain adjustment and phantom power (18V) switch accessible through the base of the unit. The MIC also has a 2 band EQ accessible through the base of the unit allowing MIC EQ to be set prior to use.

The MIC can be set to be in or out of the booth by another switch also accessible through the base of the unit.

There is a volume control for the MIC input and a CUE button allowing the user to monitor the signal pre volume control.

The MIC channel has 2 bi-colour LED's to indicate MIC input level, left is Green/Yellow and right is Yellow/Red.

When left green flashes slowly it indicates a signal of about -20dB and at -7dB it comes fully on.

When left yellow flashes it indicates a signal of -3dB and at +1dB it comes fully on. When right yellow comes on it indicates +4dB and when right red comes on it indicates +12dB or clip level.

Headphones

The headphone output is on a 3 pole ¼" jack socket on the front vertical face of the FF2.2, the output will drive headphones of greater than 32 ohms impedance.

The headphone controls include volume, CUE mix, split and pre/post EQ CUE selection. When CUE is selected on one of the channels or MIC then that signal will be available at the headphone control, note if multiple CUE buttons are pressed then there will be a mix of those signals selected.

The headphone volume control sets the level at the headphone output, start with the volume set to low and establish a signal in the headphones before increasing the headphone volume. Take note of channel metering when switching CUE from one channel to another as levels may be very different on different channels and this will be reflected in the sound level at the headphone output.

Hearing damage is a function of sound level and time, high sound levels should be avoided to avoid hearing damage, work with moderate headphone levels.

The CUE mix control provides any signal present from channels with CUE selected at one end and the master output signal at the other end with a mix in between.

The PRE-EQ switch makes the CUE on channels 1 and 2 pre EQ. The split switch provides the master signal on one side of the headphones and the CUE signal on the other.

Crossfader

The XF buttons on channels 1 and 2 assign channel 1 to the left of the crossfader and channel 2 to the right. So with channel 1 selected the cross fader in the left position will send the channel 1 signal at full level to the master and as the fader is moved to the right the level of channel 1 will reduce.

Similarly with channel 2 selected, cross fader in the right position will send the channel 2 signal at full level to the master as the fader is moved to the left the level of channel 2 will reduce.

The level of the mix of channel 1 and channel 2 on the middle section of the cross fader is determined by the fader curve which is set by a control in the output section. The fader curve control varies the rate at which the cross fader transfers between channel 1 and channel 2.

There is a switch accessible through the base which turns the cross fader off if required.

FX wet/dry

Channel 1 and channel 2 each have a switch to send that channel to the FX send jack and return the signal at the FX return jack. The wet/dry control has the send signal at one end and the return signal at the other allowing the user to sweep from no FX to full FX content by rotating the wet/dry pot end to end.

Only one FX switch should be selected at any one time otherwise both channel 1 and channel 2 are simultaneously sent and returned. The FX switch should be selected with channel fader down.

Input Section

Inputs

Channels 1 and 2 are almost identical, the difference being channel 1 assigns to the left of the cross fader and channel 2 to the right of the cross fader.

Each channel has a line and a phono input on separate RCA connects with a switch to select the required input. The line input has a gain trim accessible through the back panel.

The phono inputs have a capacitance selector accessible through the base of the unit that allows one of 4 capacitances values to be selected to best match the deck cartridge capacitance. To select the correct capacitance value take the cartridge recommended value (usually a range) and subtract the capacitance of the phono leads (typically 50pF – 100pF depending on length) and choose the nearest setting.

Choosing the optimum capacitance setting for your cartridge on phono will make the sound reproduced from vinyl slightly more accurate to what was recorded, conversely the wrong setting will produce a slightly less accurate reproduction, the difference in settings is small.

Turntables can be susceptible to low frequency noise, this noise consists of two types, the first is a very low frequency rumble and the second is up to 100Hz. The FF2.2 has a rumble filter to deal with very low frequency noise and a noise cancelling circuit to deal with noise up to 120Hz on the phono input.

The rumble filter is activated by a switch accessible through the back panel, the rumble filter starts to remove signals below 14Hz and removes most signal below 7Hz.

The FF2.2 has a phono noise cancelling feature that utilises the 120Hz bass EQ band of the mixer, just above the FF2.2 bass control is a hidden switch accessible through the front panel that allows the bass to be summed to mono.

Noise picked up on the needle arm of the turntable appears as a difference signal on the stereo left and right output, this noise is generally below 120Hz and by summing the Bass stereo signal this left right difference noise cancels thus removing it.

Audio in stereo below 150Hz contributes little if anything to the stereo image and often these frequencies in mono are considered an improvement, sub bass being mono illustrates this point.

The user can decide if they wish to have the noise cancelling effect of summing the bass with a mono bass below 120Hz and set the switch on or have the bass in stereo and no noise cancelling.

We suggest the user tries playing vinyl with and without the rumble filter and noise cancelling to decide which sounds better. Generally the effect of both these circuits is small, the rumble filter should have no detrimental effect if used even if no positive effect is detectable (if there is little or no rumble you cannot remove it), the noise cancelling will be more detectable although also small and it may be that the perceived improvement is from the mono bass as much as any noise cancelling.

Gain and level

The signal level on each channel is set by a GAIN control with a range of +/- 12dB and a linear channel fader to control the level sent to the output.

EQ

All channels have a “full kill” 4 band EQ; the EQ band frequencies are Bass up to 120Hz, Low Mid 120Hz to 800Hz, High Mid 800Hz to 4.0KHz and Treble above 4.0Khz.

Variable frequency high and low pass filters

Each channel has variable frequency high pass and low pass filters that are selected by a switch. The low pass filter is variable from 20KHz to 2KHz and the high pass filter is variable from 20Hz to 2KHz. The filters should be selected before the audio is routed to the output (fader down).

These filters operate best with a signal level of around 0dB. Once selected the filters can be set to 20Hz and 20KHz where they have a minimal effect and the frequencies adjusted either live or on cue.

Channel meter

Each channel has a 12 LED meter to indicate channel level, left and right are summed to mono and the level adjusted by -6dB so that the input meter indicates an average of left and right indicated in the output (the channel indication will show the same level as left and right output meter indication if left and right are equal).

Each channel also has a clip LED to indicate when the input is excessive or clipping.

FX

Each channel has an FX switch that when operated sends that channel to the FX send jack and routes the FX return jack to the selected channel via a wet/dry control in the output section.

This allows a single FX unit to be used for both channels without changing connections, the FX switch should be operated with fader down, use the wet/dry control to bring the FX in or out. Only one channel should have FX selected at any time.

XF

The XF switch assigns the channel to one side of the cross fader, channel 1 is left and channel 2 is right. Moving the cross fader away from the assigned side reduces that sides signal and the signal of the side moved towards increases. The rate of change between across the cross fader can be adjusted with the fader curve control.

CUE

The CUE control sends the signal in the channel selected to the headphones section, the signal sent will be either that at the top of the fader or a pre EQ signal depending on whether pre-EQ is selected in the headphone section or not.

Power Supply

The Mixer has a fully regulated power supply that is designed to operate on 220-240Vac or 110-120Vac. Selection is by an internal switch that is accessed by removing the

DAMAGE MAY RESULT IF THE UNIT IS CONNECTED TO THE WRONG SUPPLY VOLTAGE.

Fuses

Mains fuse sizes are 800mA anti-surge for 220-240Vac and 1.5A anti-surge for 110-120Vac Operation, these are located in the IEC switch connector assembly in the remote power supply block.

The +VE and –VE rail fuses are 1A anti-surge.

The 5V fuse is 250mA.

It is important for safety reasons that the correct fuse sizes are always used.

See diagram at end of manual for position of fuses.

Operational Information

Starting

Unpowered, turn over the FF2.2, a silk screen legend indicates the position of various additional controls that are to be preset before use.

Set cartridge capacitance for phono inputs to your preferred setting to best match the cartridge using a small flat bladed screwdriver, there are 4 settings, through the hole by the legend for cartridge capacitance the slotted shaft of a switch should be visible, place the screwdriver blade into the slot and lightly turn to the position you require. If in doubt turn to one end and then count clicks until you are at position.

If you require rumble filters they are enabled by a switch through the hole by the legend indicting rumble filter, push the blade of the small flat blade screwdriver through the hole and activate the switch if you require the rumble filter on, the switch is on when depressed and to switch it off gently press it again and it will click off. In the off position the switch cap is nearer the case (higher) and on the switch cap is lower.

If you are using a microphone and it requires phantom power, the phantom power switch is by the legend phantom power, push the blade of the small flat blade screwdriver through the hole and activate the switch if you require the phantom power on, the switch is on when depressed and to switch it off gently press it again and it will click off. In the off position the switch cap is nearer the case (higher) and on the switch cap is lower.

If you require your mic in the booth signal, the mic in/out of booth switch is by the legend mic in/out of booth, push the blade of the small flat blade screwdriver through the hole and activate the switch if you require the mic in the booth (switch on), the switch is on when depressed and to switch it off gently press it again and it will click off. In the off position the switch cap is nearer the case (higher) and on the switch cap is lower.

If you require the booth set to mono, the booth mono switch is by the legend booth mono, push the blade of the small flat blade screwdriver through the hole and activate the switch if you require booth mono (switch on), the switch is on when depressed and to switch it off gently press it again and it will click off.

If you require a mono output instead of sub bass, the sub bass/mono switch is by the legend sub bass or mono, push the blade of the small flat blade screwdriver through the hole and activate the switch if you require mono (switch on), the switch is on when depressed and to switch it off gently press it again and it will click off.

If you require the cross fader to be switched off, the cross fader off switch is by the legend X Fade on/off, push the blade of the small flat blade screwdriver through the hole and set the switch to off (cap higher), switch is on when depressed (lower) and to switch it off gently press it again and it will click off.

The remaining presets through the base of the unit require the FF2.2 to be active to set (booth pan, mic gain and mic EQ), so now return the FF2.2 to correct way up.

On the FF2.2 set the faders down, all switches to off and volume controls (pots) to minimum. EQ pots should be set to MID, high and low pass filter pots should be set to the white dots by the knobs. Set X Fade curve, FX wet/dry and Cue/Master mix pots to mid position.

The phono noise cancelling feature is enabled or disabled by a switch through the front panel located between the bass and low mid EQ pots. If you require the noise cancelling to be on use a cocktail stick through the hole and gently set the switch to on, switch is on when depressed (lower) and to switch it off gently press it again and it will click off. In the off position the switch cap is nearer the case (higher) and on the switch cap is lower.

Connect FF2.2 to remote power supply and plug remote power supply into mains supply ensuring it is correct supply (switch mains supply on at wall socket leaving switch at remote power supply IEC inlet off).

Connect line and phono inputs, microphone, headphone, FX send/return, master to amplifier/speakers and booth to amplifier/booth monitors.

Check connections then switch FF2.2 on using switch by IEC connector on remote power supply. Check green neon comes on.

Activate line input and adjust channel gain pot until LED meter is indicating a level of 0dB. Deactivate line input and switch input switch to phono, play some vinyl and check average level is still around 0dB, if necessary adjust channel gain pot to achieve 0dB.

Deactivate phono input and switch back to line, reactivate the line input and if you have adjusted the gain on phono the level will now be above 0dB, there is a gain trim accessible through the back (connection face) of the FF2.2 adjacent to the relevant input, using a small flat bladed screwdriver adjust the level so that the LED meter indicates 0dB. Do this for channel one and channel two and you will have same level for line and phono without having to adjust the gain providing you continue to use the same equipment into each input (a different CD player or turntable may require another adjustment).

Leave the line input active and put the channel fader full up, turn the master control up and the master meter should start to illuminate, set the master control for 0dB on the meter. Now adjust your amplifier for your required normal (0dB) sound level,

On the channel your gain pot should be around middle position giving room to increase the level on the channel and similarly your master pot should be around middle position giving you room to increase the output level using the master.

Now turn up the booth control and the booth meter should start to illuminate, set the booth control for 0dB on the meter. Now adjust your amplifier for your required normal (0dB) sound level.

If you require to pan the booth stereo image turn the FF2.2 onto its side and using a small flat bladed screwdriver adjust the booth pan control indicated by the legend on the base of the unit. Gently insert the blade into the slot of the control and rotate clockwise or anticlockwise to achieve the desired amount and direction of panning.

Deactivate the line input and put the channel faders down, turn the microphone up and talk into the microphone, set the microphone volume control to middle position. If the microphone level is unsatisfactory in this position turn the FF2.2 on its side and using a very small flat bladed screwdriver locate the microphone gain control on the base of the unit indicated by the legend. Insert the blade gently in the slot and turn to increase or decrease the gain (level) while talking into the microphone, adjust until you have the desired microphone level. In setting the microphone to the required level with the control at middle position you have room to increase the level should you require.

Now adjust the microphone EQ if required, the microphone EQ is controlled by two pots through the base of the unit indicated by silk screen legend and allows adjustment of bass and treble. Use a small flat bladed screwdriver to gently turn the controls to achieve the desired effect, with both controls in middle position the EQ is flat.

Turn the microphone down and reactivate a line input, set the fader up for the channel with the line input. Adjust the headphone cue/master control to master, put the headphones on and adjust the headphone volume to a level you are comfortable with.

Activate a line input on the other channel and press the cue button on that channel, adjust the cue/master control to cue and you should hear the audio from the channel with the cue switch enabled.

On the channel with the CUE switch selected, select the channel filter, now operate the low and high pass filters by adjusting the LPF and HPF controls, become familiar with what they do to the sound and how they operate.

Remove the headphones, you should still have a line input active playing through to the master. Put the fader on the channel that is playing down, operate the FX switch on that channel and turn the fader up.

Adjust the FX wet/dry control to dry and you should have audio at the master with no FX, set the FX control to wet (and assuming you have plugged in and switched on an FX unit) you will have the audio with FX.

Set the channel FX switch to off and set both channel faders down, activate a line input to both channels and on both channels activate the XF switches. The audio to the master is now controlled by the crossfader, moving to one side results in the line input from that side appearing at the master and moving to the other side sends the line input of that side to the master.

What happens in between is determined by the fader curve control, this adjust the rate at which a side fades out and the other side comes in, experiment with adjusting the control to become familiar with what it does and perhaps establish a position you favour.

Your FF2.2 is now set up and ready to go, the channel 3 input has only a volume control on the front panel and no other adjustment, note the channel 3 input has +6dB of gain so with the channel 3 volume control in middle position you are sending to master the same level as present at the input. This gives room to increase the level if required.

INSTALLATION, CONNECTIONS AND GOOD WIRING PRACTICE

The installation of professional audio systems should be left to experienced engineers wherever possible. The interconnection of audio systems can be fairly complex depending on the type and size of system and obviously well outside the scope of this handbook. We have included a few basic points for information for anyone who is new to audio systems.

Good wiring practice should be observed when connecting any audio equipment. Good quality
connectors and screened cable should be used for all audio connections .

Twin screened cable should be used for all balanced lines particularly microphone connections.
Always ensure cable clamps in connectors are fully tightened and gripping the outer sheath.

Good strain relief and mechanically sound connections will increase reliability at virtually no extra cost.

You must not disconnect the mains earth wire from the mains plug of any equipment. This is fitted for safety reasons and must be connected to ensure that the case is earthed.

Formula Sound reserve the right to alter specifications at any time without notice.

All Formula Sound products are designed and manufactured in our own factory which enables us to maintain strict quality at every stage of manufacture. This attention to detail has helped to win us 14 industry awards to date and has earned us a world wide reputation for the high quality and reliability of our products.

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FF2.2 Specification

Frequency response
E.Q. set flat — 20Hz – 20Khz +/-0.5dB

Maximum output level
Master and Booth monitors output
active balanced. — +22dBu

Distortion
any channel input +10dBu — < 0.01% typically <0.005%

Noise measured 20Hz-20kHz
Stereo inputs e.q. flat gain set to max — EIN < -98dB
RIAA stage ref. 5mV 1kHz Input shorted — -80dBV "A" weighted
Microphone input (ref 150R) — EIN < -124dBU

Gain
CH1 & CH2 Stereo inputs — +/-12dB
CH3 Balanced stereo input — +6dB
Microphone input max — +70db
Microphone input min — +0dB

Maximum input level
Stereo input A (line) — +20dBV
Stereo input A (RIAA) — -8dBV 400mV
Stereo input B — +20dBV
Microphone — +4 dBV

Input Impedances
Stereo input A — > 47k ohms
Stereo input B — > 10k ohms
Microphone input — > 2k ohms active balanced

Equalisation

4 band EQ per channel	+9dB -26 dB @	Treble	4Khz – 20Khz
		High Mid	800Hz – 4Khz
		Low Mid	120Hz – 800Hz
		Bass	20Hz – 120Hz
Mic EQ	+10dB - -10dB	HF	
		LF	

Dimensions
(Exc. Knobs & connectors):

Width 212mm (8.35")
Height 355.2mm (13.99"- 8RU)
Depth 110mm (4.33")

Balanced outputs For unbalanced operation strap pins 1&3 to ground and use pin 2 hot. This will result in no loss of output level or performance.

FORMULA SOUND LIMITED

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CE

E.U. CERTIFICATE OF CONFORMITY

We declare that the products listed conform to the following directives and standards

89/336/EEC amended by 92/31/EEC and 93/68/EEC

BS EN 50082-1 BS EN 50081-1

PRODUCT TYPE

FF 2.2

The CE mark was first applied in 1995

Signed BJ Pen

B. J. Penaligon General Manager

Attention

The attention of the specifier, purchaser, installer, or user is drawn to the fact that good wiring practice must be observed when connecting the above equipment. Good quality connectors and screened cables must be used for all audio connections. Twin screened cables should be used for all balanced lines.

THIS EQUIPMENT MUST BE EARTHED

CONSULT THE USERS MANUAL FOR TECHNICAL DETAILS