Shure Brothers Incorporated
222 Hartrey Avenue
Evanston IL 60202-3696 U.S.A.

Model FP32 User Guide

GENERAL

The FP32 is a portable stereo mixer for electronic news gathering (ENG), electronic field production (EFP), or film production. This very small mixer provides all the most needed features and quality for professional stereo broadcast remotes.

FEATURES

Inputs

- Three transformer-coupled, 3-socket XLR-connector inputs; each switchable to low-impedance microphone or line level
- Phantom (simplex) or A-B(T) power for condenser microphones available at each microphone input
- Built-in tone oscillator for level checks or line tests
- Slate microphone with automatic gain control (AGC) for take identification or for emergency use
- Slate tone for identifying take locations during editing
- Stereo monitor input for headphone listening to external signal with no interruption of broadcast or taping functions of mixer

Outputs

- Transformer-coupled Left and Right 3-pin XLR-connector outputs, each switchable either to low-impedance balanced microphone or to 600-ohm balanced line level
- Left and Right Tape outputs to feed tape recorder inputs or other unbalanced Aux-level inputs
- Two stereo headphone jacks (8 to 2,000 ohms, ¼-inch and 3.5 mm jacks) driven by stereo headphone power amplifier with separate Phones level control. Either or both jacks can drive Aux or unbalanced line-level inputs.

Controls and Indicators

- Active, feedback-type input gain controls permit direct input of high-level sources without input attenuators

  Pan pots, with center detent, for each input permit infinitely variable assignment of input signals to Left or Right outputs
- Lo-Cut filters available at each input to reduce extraneous low-frequency interference
- Built-in Limiter with adjustable threshold—prevents output clipping of mixer or input overload of amplifier, telephone line, or tape deck
- LED indicator flashes during Limiter operation or to signal overload with Limiter defeated
- Professional dual VU meters for Left and Right channels, factory set for 0 VU = +4 dBm, internally adjustable for other VU levels
- VU lamp, stays illuminated while pushbutton is depressed, automatic 4-second turnoff after button is released
- Battery check function with readout on VU meter
- Dual clutched Master gain control for individually adjustable or tracking Left and Right levels at Line/Mic and Tape outputs, as well as Tone Oscillator and Slate Mic levels
- Phone level control adjusts output at both headphone jacks

Power

- Mixer is powered by two standard 9V alkaline batteries that also supply phantom power for condenser microphones
- Phantom power input jack for use with external phantom supply
- Extremely low battery drain provides 6-hour minimum battery life under normal conditions
- Separate 9V alkaline battery supplies A-B power for condenser microphones; third battery is not required if A-B power is not used
- Spring-loaded battery compartment prevents incorrect insertion of batteries; batteries available for replacement instantly when compartment door is opened
- Mixer can be externally powered from any 11 to 18 Vdc source such as: battery belt pack, automotive electrical system, video tape recorder, or low-ripple ac power converter

Mechanical Characteristics

- Extremely rugged and durable construction
- Very small size and light weight
- Carrying case and detachable shoulder strap supplied
- All input and output connectors are professional standard types

Performance

- Reliable operation under wide extremes of temperature and humidity
- Extremely low noise and low RF susceptibility permit use near transmitters and in strong hum fields
- Wide, flat response, extremely low distortion, and up to +18 dBm output level provide studio-quality performance in a portable mixer

27A8084 (LE)
Printed in U.S.A.

SPECIFICATIONS

Frequency Response
50 to 15,000 Hz ±2 dB

Distortion
Less than 0.25% total harmonic distortion at +4 dBm, 50 Hz to 15 kHz

Noise
Less than –128 dBV equivalent input noise

Common Mode Rejection
65 dB minimum at 100 Hz, –20 dBV input

Inputs

	IMPEDANCE		Input Clipping
	For Use With	Actual	Level
Mic	19 to 600 Ω*	1 kΩ	–47 to –17 dBV (4.4 to 141 mV)
Line	Less than 10 kΩ	66 kΩ	+3 to +33 dBV (1.4 to 45 V)
Monitor	Less than 10 kΩ	24 kΩ	+35 dBV (56 V)

*Including phantom or A-B(T) powered, and dynamic or ribbon microphone

Tone Oscillator
1 kHz nominal at +4 dBm, Masters at approx 6, both outputs

Slate Tone
400 Hz, 1 sec, each time button is depressed

Slate Microphone
Electret Condenser, omnidirectional, with AGC, activated while slate button is depressed

Outputs

	IMPEDANCE		Output Clipping
	For Use With	Actual	Level
Mic	Any low-Z mic input	1 Ω	–34 dBV (20 mV) minimum into 150 Ω
Line	600 Ω input	330 Ω	+16 dBm minimum into 600 Ω
Tape	8 kΩ or greater high level input	7.5 kΩ	–6 dBV (0.5 V RMS) into 47 kΩ
Phone	8Ω to 2 kΩ	100 Ω	+5 dBV (1.8 V) minimum into 200 Ω

Phase
3-pin input and output connectors in phase; pin 2 in phase with tip of phone and mini jacks

Gain (at 1 kHz

INPUT	OUPUT			
	Mic	Line	Tape	Phone
Mic	40 dB	90 dB	68 dB	95 dB
Line	–10 dB	40 dB	18 dB	45 dB
Mon	—	—	—	12 dB

Controls
CHANNEL GAIN: Active, feedback type, individual for each input; Channel 1 control pulls out to activate Tone Oscillator

DUAL MASTER GAIN: Clutched, individually adjustable; control L and R Line/Mic and Tape outputs, and Tone Oscillator and Slate levels

PAN POTS: Individual for each input; assign any proportion of input signal to L and R outputs; center detent for equal amount of signal to each output

LOW-CUT FILTERS: Individual for each input; 6 dB rolloff at 150 Hz, –6 dB/octave slope

PHONES LEVEL: Controls both headphone outputs

LIMITER SWITCH: Controls Line/Mic and Tape outputs; +14 dBm factory-set threshold, internally adjustable down to +3 dBm; 3 msec attack, 500 msec recovery time typical

PHANTOM/DYNAMIC/A-B SELECTORS: Individual for each input; supplies 11 to 18 Vdc phantom (simplex) or 9 Vdc A-B power with input in MIC position; supplies no power with Selector in DYN position (for dynamic or ribbon microphones) or with input in LINE position

Separation (L and R outputs)
35 dB minimum at 1 kHz, 30 dB minimum at 10 kHz

Control Interaction
Less than 1 dB with any control combination

Master Control Tracking
L and R outputs within 2 dB with input Pan control at center detent

Overload and Shorting Protection
Shorting outputs, even for prolonged periods, shall cause no damage. Microphone inputs will not be damaged by signals up to 3 volts

Indicators
POWER ON: Green LED flashes at approximately 1-second repetition rate as long as power switch is on

PEAK/OVERLOAD: Limiter IN – Red LED flashes to indicate onset of limiting; Limiter OUT – flashes 6 dB below output clipping level

BATTERY CHECK: Converts upper (Left channel) VU Meter to battery condition or circuit voltage indicator; 0 VU or higher indicates good batteries or adequate (11 to 18 Vdc) external power source

VU METERS: Factory-set at 0 VU = +4 dBm; 0 VU level internally screwdriver adjustable

VU Lamps: Illuminate meters while button is depressed; automatic shutoff 4 seconds after release

Power
MIXER AND PHANTOM (SIMPLEX) POWER: Supplied by two internal 9 V standard alkaline batteries (Duracell MN1604 or equivalent) or external 11 to 18 Vdc supply; 6-hour battery life under normal operation

PHANTOM POWER: 11 to 18 Vdc nominal through 620 Ω

EXTERNAL PHANTOM POWER INPUT: 12 to 18 Vdc. Overrides internal phantom supply when external voltage source is connected; see Operation section if using 48 Vdc external supply

A-B POWER: Supplied by additional internal 9 V standard alkaline battery (not required unless A-B powered microphones are in use)

Connectors
LINE/MIC INPUTS AND OUTPUTS: 3-pin XLR-type

TAPE OUTPUTS: 3.5 mm mini jacks

PHONES: Stereo jacks; one standard 1/4-inch phone and one 3.5 mm mini

MONITOR INPUT: 3.5 mm mini stereo switching jack

12 VDC EXTERNAL POWER: Single-pin coaxial dc power jack

EXTERNAL PHANTOM POWER: 3.5 mm mini switching jack

Temperature Range
OPERATING: –18 to 57°C (0 to 135° F)

STORAGE: –29 to 71°C (–20 to 160°F)

Dimensions
59 mm H x 184 mm W x 153 mm D (2-5/16 x 7-1/4 x 6 in.)

Net Weight (less batteries)
1.13 kg (2.5 lb)

Supplied Accessories
Removable shoulder strap; carrying case

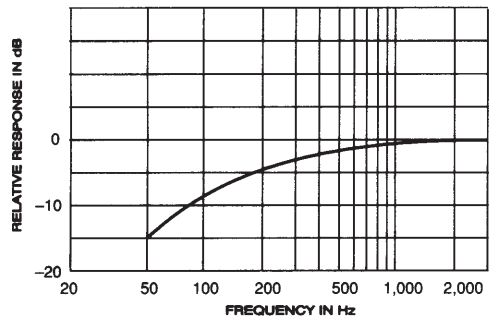
OPERATION

Line/Mic Inputs and Outputs

XLR-type 3-pin connectors, transformer-coupled balanced-line circuits; pins 2 and 3 are signal conductors; pin 1 is ground. All XLR connectors are in phase with one another.

Lo-Cut Filters

Activated by In/Out switch above each Channel Gain Control to provide low-frequency rolloff as shown in Figure 1. Reduce undesirable low-frequency signals such as wind noise.



LO-CUT FILTER ACTION
FIGURE 1

Pan Pots

Center detented rotary controls assign graduated portion of each input signal to Left or Right output. At center detented position, equal amounts of signal go to Left and Right outputs.

Channel Gain Controls

Determine preamplifier gain and provide preamplifier output attenuation. As gain is reduced, input clipping level increases for channel. Optimum signal-to-noise ratio occurs with Channel controls set as high as possible (consistent with maintaining adequate control range and input clipping level).

Tone Oscillator

Activated by pulling out Channel 1 control knob; stable 1 kHz oscillator; level determined by Master gain controls. Oscillator signal appears at all outputs. When not in use, Channel 1 control knob should be pushed in.

Slate

Depressing Slate button activates 1-second 400 Hz tone and turns on Slate Microphone. Omnidirectional electret Slate Microphone remains on while button is depressed, can be used to identify recorded segments or as emergency field microphone. Slate Tone and AGC'd Microphone audio levels are controlled by Master Gain Controls.

Master gain Controls

Dual clutched controls determine output levels at Left and Right Line/Mic and Tape outputs. Master Gain controls also determine Left and right output levels for Tone Oscillator and for Slate-Tone and -Microphone.

Monitor Input Jack

3.5 mm stereo switched input; insertion of 3.5 mm plug causes headphone amp to monitor external stereo source; plug removal causes headphone amp to resume monitoring internal program. Jack wired: tip to Left channel; ring to Right channel.

Headphone Jacks

Two stereo jacks: one mini 3.5 mm and one 1/4-inch phone. Mixer output, including Tone Oscillator, Slate Tone and Slate Microphone, appears at headphone jacks; Left channel to tip, Right channel to ring. Headphone outputs can be used to drive up to four Aux-level recorder or amplifier inputs. To wire either connector for two outputs, connect appropriate mating stereo plug as follows: one conductor to tip; other conductor to ring; shield(s) to sleeve.

Phones Control

Sets output level at headphone jacks.

Limiter

Limiter In/Out switch turns on fast-acting, peak-responding limiter circuit to cut overload distortion during loud program intervals without affecting normal program levels. Limiter switch In (operating) restricts maximum mixer output to approximately +14 dBm. Increasing individual Channel or Master gain controls increases both average output and amount of limiting. To change Limiter threshold, see section on Limiter Threshold Adjustment.

Peak LED

Indicates Limiter operation with Limiter switch In. With switch Out, flashes at 6 dB below output clipping. Peak indicator responds much faster than meter, activated by even shortest transient peak, yet remains lit long enough to provide easy recognition.

VU Meters

Factory calibrated for +4 dBm = 0 VU with 600-ohm load at line output. (Microphone output levels are 50 dB below Line output.) Supplied 0 VU level is recommended for normal use to provide approximately 14 dB headroom between operating level and clipping level. To change 0 VU level, see section on VU Meter Adjustment.

VU Lamps

Illuminate meters while button is depressed; automatically turn off 4 seconds after release to prevent battery drain.

Tape Outputs

3.5 mm Left and Right jacks to feed unbalanced Aux-level inputs of tape recorder or amplifier. Tip of connectors in phase with pin 2 of XLR connectors.

Condenser Microphone Power

Condenser microphones, either 12 to 18 Vdc phantom (simplex) powered or 9 Vdc A-B(T) powered, can be supplied from any Mic input of FP32. Below batteries, inside battery compartment, are three 3-position switches. Center position is for dynamic microphones (no dc power supplied to Mic input); left position is for 9-Vdc A-B power, right position is for 11- to 18-Vdc phantom power.

NOTE: No power is supplied to any input with Line/Mic switch in Line position. No A-B power is supplied unless right-side battery is present.

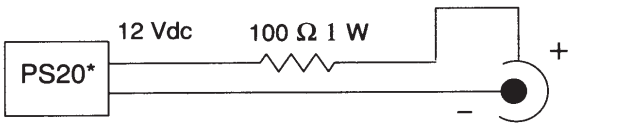
Phantom Power Input

If desired, an external 12-18 Vdc phantom power source can be connected to this 3.5 mm mini jack input. Insertion of plug overrides internal phantom supply. An external 48 Vdc supply may be connected to this jack to power condenser microphones that require 48 Vdc. When using a 48 Vdc supply, replace R112, R113, R127, R128, R142, and R143 by 6.65 k, 0.5 W 1% resistors.

Mixer Powering

In ordinary portable use, the FP32 is powered by two standard 9-Vdc alkaline batteries installed in leftmost battery compartment positions. Phantom power is also supplied by these batteries.

The FP32 can also be powered by an 11 to 18 Vdc external source, such as an automotive battery, battery beltpack, Shure PS20 AC Adapter or other low-ripple ac power converter (see Figure 2), using the12 Vdc single-pin coaxial input connector in the left-side panel. To filter possible power-supply hum and noise, install a 100 Ω resistor on the "+" side of the dc output. The outside barrel of the mating connector is positive.



***Wire with white stripe is 12 V+** Coaxial Power Plug

Cut off molded dc power plug of PS20 and wire new connector as shown

POWERING FP32 FROM EXTERNAL AC ADAPTER
FIGURE 2

Parts Required:

1 Shure PS20 AC Adapter or equivalent (dc output = 12 Vdc, 100 mA minimum)

1 100 Ω 1 W resistor

1 Coaxial dc power plug to fit FP32 external dc power jack (2.1 or 2.5 mm I.D.) Radio Shack #274–1567A

Batteries can be left in place as backup in case of failure of external source. Switchover to internal batteries is performed by disconnecting external plug.

CAUTION

12 Vdc input circuit is not fused. Any external source should be provided with in-line fuse, 0.25 A, 250 V, as safety precaution.

Battery Check

Depressing BATT button converts upper (Left) VU Meter to readout of battery condition (two mixer-powering batteries) or of supply voltage. Readings of 0 VU or higher indicate good batteries or adequate external supply.

Telephone Lines

In Line position, Left and Right output transformers will operate with dc-biased "dialed up" telephone lines although there may be slight increase in distortion. When connecting FP32 to telephone line, use FCC-Registered* interface adapter between mixer and telephone line.

*DOC-Certified in Canada

VU METER ADJUSTMENT

To set the VU Meters for a value different from the supplied 0 VU = +4 dBm, proceed as follows.

1. Connect a 600-ohm load to the Left Line output.
2. Connect an ac voltmeter (e.g., HP 400GL) in parallel with the load.
3. Set channel 1 Pan Pot to center position, and pull out the Channel 1 knob to activate the Tone Oscillator.
4. Adjust the Tone Oscillator level with the Left Master gain control until the ac voltmeter reading is at the level desired.
5. With a screwdriver, adjust the Left VU Level trimpot (left of the A-B/DYN/PHAN Selector switches) until the Left VU Meter reads 0.
6. Repeat for Right Output and Right VU Meter.

LIMITER THRESHOLD ADJUSTMENT

To adjust the Limiter threshold for a value different from the supplied +14 dBm, proceed as follows.

1. Connect a 600-ohm load and an ac voltmeter to Left Line output as described in steps 1 and 2 above.
2. Set Channel 1 Pan Pot to center position, and pull out the Channel 1 knob to activate the Tone Oscillator.
3. With Limiter switch Out, adjust Left Master gain control until the ac voltmeter reading is at the level desired.
4. Move the Limiter switch In, and adjust Left Limiter Threshold trimpot (left of the VU Level trimpot) until the level drops 0.5 dB.
5. Repeat for Right output and Right Limiter trimpot.

FURNISHED ACCESSORIES

Carrying Case 95A8137
Shoulder Strap 90BX2600