

# SHURE®

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## Model FP11 User Guide



### GENERAL

The FP11 is a portable, in-line amplifier designed to provide up to 84 dB of gain so that microphone and auxiliary level devices can be run at line levels. The FP11 is ideal for use in broadcasting and film and video production where long lines must be driven at higher than microphone or aux levels. The FP11 can also be used to interface equipment requiring different signal levels.

### FEATURES

- Selects up to 84 dB gain in 6 dB increments
- Wide-range frequency response
- Low input noise and harmonic distortion
- Low susceptibility to radio-frequency interference
- Selectable peak limiter operation
- Peak LED indicates onset of limiting (peak limiter on) or 6 dB below clipping (limiter off)
- Balanced, locking XLR input and output connectors
- Additional aux-level mini phone jack input and line-level binding post output
- Rugged construction, with durable belt clip for extended field use
- Powered by easily obtainable 9V alkaline battery

### SPECIFICATIONS

#### Voltage Gain (ref 1 kHz)

Lo-Z Mic Input: +84 dB  $\pm$ 2 dB (max gain setting)

High-Level Input: +63 dB  $\pm$ 2 dB (max gain setting)

#### Frequency Response (ref 1 kHz)

20 Hz to 20 kHz, +1, -3 dB

#### Equivalent Input Noise

-129 dBV (+84 dB gain; source resistance 150 ohms; load resistance 600 ohms; 300 Hz to 20 kHz)

#### Total Harmonic Distortion

Less than 0.5% (40 Hz to 20 kHz; measured at +15 dBm)

#### Clipping Levels

Output: +18 dBm minimum into 600 ohms

Input: -20 dBV (minimum gain; 1 kHz; Mic Input)

#### Limiter

Range: 20 dB

Attack Time: 3 ms typical

Recovery Time: 500 ms typical

Threshold: +12 dBm (+9.8 dBV)

#### Impedance

##### Input

Lo-Z Mic: 1k  $\pm$ 10% at 1 kHz

High Level: 150k  $\pm$ 10% at 1 kHz

##### Output

300 ohms  $\pm$ 10% at 1 kHz (designed for  $R_L$  of 600 ohms)

#### Phase

Inputs in phase with output. Pin 2 of Mic Input in phase with High Level Input jack tip. Red binding post connects to pin 2 and black binding post connects to pin 3 of Output XLR connector.

#### LED Indicator

Limiter on: indicates onset of limiting

Limiter off: indicates when output signal is 6 dB below clipping level

#### Protection

Protected against damage from shorted outputs and input overload (up to 2V)

#### Power

Type: 9V alkaline battery (Duracell MN1604 or equivalent)

Battery Life: Approximately 25 hours under normal operating conditions

Current Drain (typical): 6 mAdc (idle); 55 mAdc (clipping into 600 ohms; limiter on)

#### Temperature Range

Operating: 0° to 49°C (32° to 120°F)

Storage: -29° to 74°C (-20° to 165°F)

## Connectors

### Inputs

Mic: Locking 3-socket XLR

High Level: 3.5 mm miniature phone jack

### Outputs

Line Level: Locking 3-pin XLR; low-profile binding posts

### Battery Test

Insulated tip jacks; red (positive) and black (negative)

## Case

Die-cast zinc; matte black enamel

## Overall Dimensions

80.9 mm x 150 mm x 55.5 mm (3-3/16 in. x 5-29/32 in. x 2-3/16 in.)

## Net Weight

521 grams (1 lb 2 oz)

## CONTROLS, CONNECTORS, INDICATOR

**Pwr On-Off Switch:** applies battery power to the FP11 circuitry.

**Gain Control:** provides adjustable voltage gain from unity (0 dB) to +84 dB in 15 6-dB steps.

**Limiter On-Off Switch:** engages limiter in On (In) position so that **Peak** LED indicates onset of limiting. In Limiter Off (Out) position, Peak LED indicates when output signal is 6 dB below clipping level.

Three-Socket Professional and 3.5 mm **In** Connectors: provide both low-impedance microphone-and high-level inputs for virtually all signal sources.

Three-Pin Professional and Binding Post **Out** Connectors: provide a line level output signal designed to feed a resistive load of 600 ohms.

**Batt Test** Jacks: can be used to check condition of 9V battery.

## OPERATION

### Battery Replacement

Use a coin or screwdriver, turning one-quarter turn in either direction, to open the battery compartment door. Insert a fresh 9V alkaline battery (NEDA 1604A, Duracell MN1604, Eveready 522, or equivalent) in the compartment. Note that the battery contacts are polarized, and the battery cannot be inserted improperly. The compartment door can be closed by pressing shut when the fastener is properly aligned.

### Connections

Connect the signal source to the microphone-level, XLR-type, 3-socket **In** connector or the high-level, 3.5 mm, miniature **In** phone jack. Connect the line level, XLR-type, 3-pin or binding post **Out** connector to the line level input of the mixer, tape recorder or amplifier. Note that the FP11 will operate with dc-biased, dialed-up telephone lines (with a possible slight increase in distortion).

When connecting the FP11 across a telephone line, check whether the local telephone company requires an interface coupler (such as a Western Electric 30-type Voice Coupler) between the FP11 and the telephone line.

If the FP11 is to be connected to a telephone line that is subject to lightning-induced voltage surges, the following part can be wired across the FP11 output terminals to provide additional protection for output components: Metal Oxide Varistor, GE Type V22ZA1.

### Operation

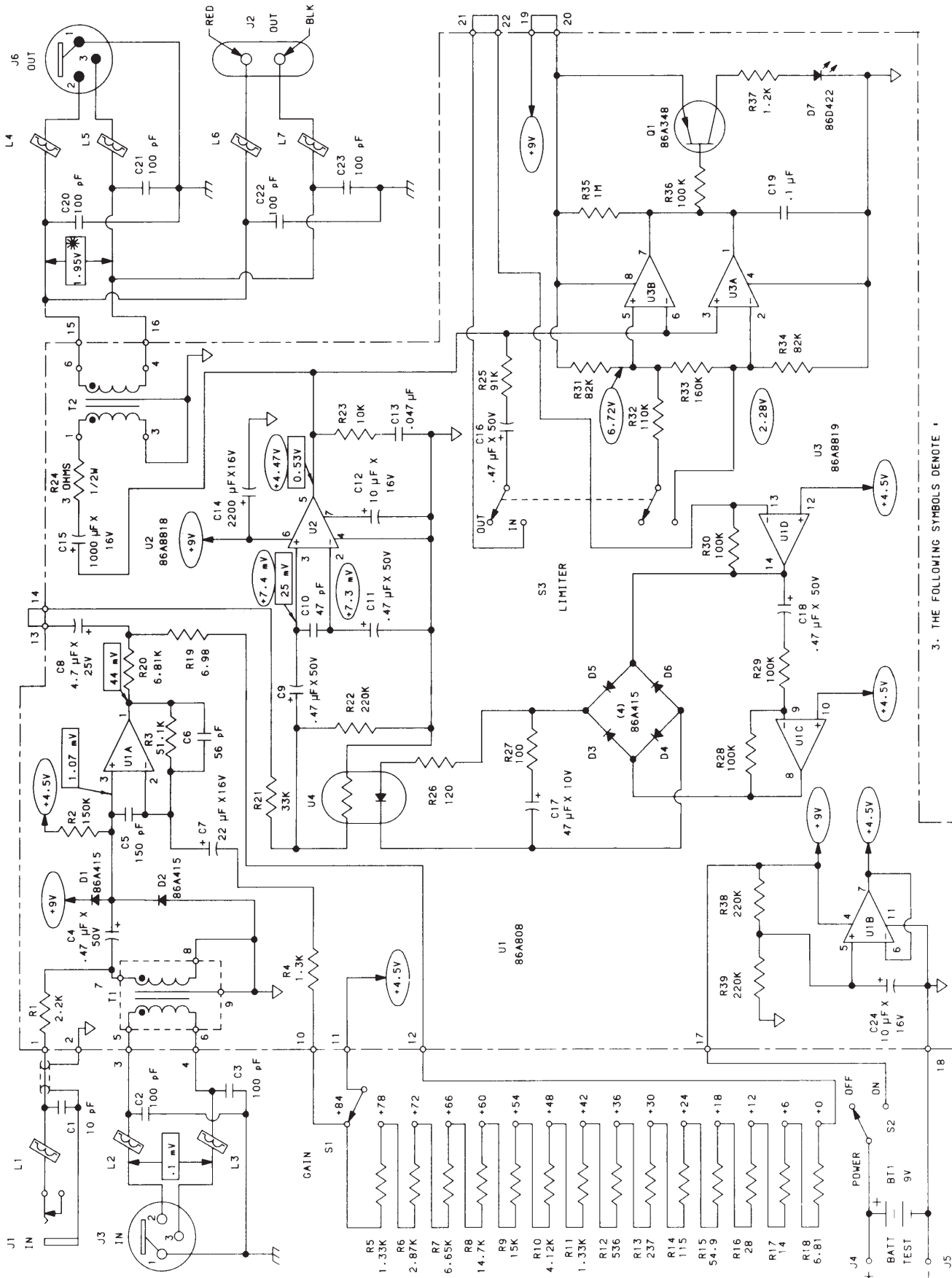
Position the FP11 for operation. Note that the belt clip can be used to secure the unit to a belt, trousertops, or D-rings on other equipment. The belt clip can easily be removed if desired.

Turn the **Power** switch on and adjust the **Gain** switch for the amount desired (up to 84 dB for microphone-level input signals; up to 63 dB for high-level input signals). Turn on the limiter if desired. Note that the red LED indicates the onset of limiting with the limiter on, or the point where the signal is 6 dB below clipping level when the limiter is off.

Battery voltage can be checked at any time without removing the battery or applying power to the FP11. Inserting voltmeter leads in the **Batt Test** jacks (observe proper polarity) will indicate battery condition.

## REPLACEMENT PARTS LIST

REFERENCE DESIGNATION	DESCRIPTION	SHURE PART NO. OR COMMERCIAL ALTERNATE
BT1	Battery, Alkaline, 9V	Duracell MN1604
C4, C9, C11, C16, C18	Capacitor, Electrolytic, 0.47 $\mu$ F, 50V	Shure 10103FT
C7	Capacitor, Electrolytic, 22 $\mu$ F, 16V	Shure 10106FT; Sprague 226M016AA3D
C8	Capacitor, Electrolytic, 4.7 $\mu$ F, 25V	Shure 10107FT; Nichicon UKB1E4R7KAA
C12, C24	Capacitor, Electrolytic, 10 $\mu$ F, 16V	Shure 10109FT; CDE PC10-25
C14	Capacitor, Electrolytic, 2200 $\mu$ F, 16V	Shure 10111FT; Nichicon 1C222MRA
C15	Capacitor, Electrolytic, 1000 $\mu$ F, 16V	Shure 10112FT; Mallory 1000S16
C17	Capacitor, Electrolytic, 47 $\mu$ F, 10V	Shure 10113FT; Sprague 503D476F10LA
D1-D6	Diode, Silicon, Computer, 75V	Shure 86A415; GE 1N4148
D7	Light-Emitting Diode, Red	Shure 86D422; General Instrument MV5075C
J1	Jack, Miniature Phone, 3.5 mm, In	Shure 10201FT
J2	Terminal, Dual Push-Type, Out	Shure 10202FT
J3	Connector, 3-Socket XLR, In	Shure 95A8060; Cannon XLR-3-31-F77
J4	Terminal, Battery Test, Red	Shure 10203FT; Alco TBA-2
J5	Terminal, Battery Test, Black	Shure 10204FT; Alco TBA-0
J6	Connector, 3-Pin XLR, Out	Shure 95A8061A; Cannon XLR-3-32-F77
L1-L7	Ferrite Bead Ring	Shure 80A250; Stackpole 57-0181
MP1	Belt Clip (without screws)	Shure 53A1891
MP2	Control Knob, Gain	Shure 65A1533
MP3	Circuit Access Cover (without belt clip)	Shure 32A678
Q1	Transistor, Silicon, PNP	Shure 86A350; Motorola 2N5087
R3	Resistor, Metal Film, 51.1k, 1%	Shure 10303FT; TRW-IRC TO-60
R4	Resistor, Metal Film, 1.3k, 1%	Shure 10304FT; TRW-IRC TO-60
R5, R11	Resistor, Metal Film, 1.33k, 1%	Shure 10305FT; TRW-IRC TO-60
R6	Resistor, Metal Film, 2.87k, 1%	Shure 10306FT; TRW-IRC TO-60
R7	Resistor, Metal Film, 6.65k, 1%	Shure 10307FT; TRW-IRC TO-60
R8	Resistor, Metal Film, 14.7k, 1%	Shure 10308FT; TRW-IRC TO-60
R9	Resistor, Metal Film, 15k, 1%	Shure 10309FT; TRW-IRC TO-60
R10	Resistor, Metal Film, 4.12k, 1%	Shure 10310FT; TRW-IRC TO-60
R12	Resistor, Metal Film, 536 ohms, 1%	Shure 10311FT; TRW-IRC TO-60
R13	Resistor, Metal Film, 237 ohms, 1%	Shure 10312FT; TRW-IRC TO-60
R14	Resistor, Metal Film, 115 ohms, 1%	Shure 10313FT; TRW-IRC TO-60
R15	Resistor, Metal Film, 54.9 ohms, 1%	Shure 10314FT; TRW-IRC TO-60
R16	Resistor, Metal Film, 28 ohms, 1%	Shure 10315FT; TRW-IRC TO-60
R17	Resistor, Metal Film, 14 ohms, 1%	Shure 10316FT; TRW-IRC TO-60
R18	Resistor, Metal Film, 6.81 ohms, 1%	Shure 10317FT; TRW-IRC TO-60
R19	Resistor, Metal Film, 6.99 ohms, 1%	Shure 10318FT; TRW-IRC TO-60
R20	Resistor, Metal Film, 6.81k, 1%	Shure 10319FT; TRW-IRC TO-60
S1	Switch, Rotary, Gain	Shure 10401FT
S2	Switch, Slide, DPDT, Power On/Off	Shure 10402FT
S3	Switch, Slide, DPDT, Limiter In/Out	Shure 55A8020
T1	Transformer, Input	Shure 10501FT
T2	Transformer, Output	Shure 10502FT
U1	Integrated Circuit, Quad Operational Amplifier	Shure 86A808A; Raytheon RC4156DB
U2	Integrated Circuit, Audio Power Amplifier	Shure 86A8818
U3	Integrated Circuit, Dual Comparator	Shure 86A8819; Motorola LM393N
U4	Opto-Isolator	Shure 10601FT



J1 IN  
 J2 OUT  
 J3 IN  
 J4 BATT TEST  
 J5  
 R1 2.2K  
 R2 150K  
 R3 5.1K  
 R4 1.3K  
 R5 1.33K  
 R6 2.87K  
 R7 6.65K  
 R8 14.7K  
 R9 15K  
 R10 4.12K  
 R11 1.33K  
 R12 536  
 R13 237  
 R14 115  
 R15 54.9  
 R16 28  
 R17 14  
 R18 6.81  
 R19 6.98  
 R20 6.81K  
 R21 33K  
 R22 220K  
 R23 10K  
 R24 3 OHMS  
 R25 91K  
 R26 120  
 R27 100  
 R28 100K  
 R29 100K  
 R30 100K  
 R31 82K  
 R32 110K  
 R33 160K  
 R34 82K  
 R35 1M  
 R36 100K  
 R37 1.2K  
 R38 220K  
 R39 220K  
 C1 10 pF  
 C2 100 pF  
 C3 100 pF  
 C4 .47 μF X 50V  
 C5 150 pF  
 C6 56 pF  
 C7 22 μF X 16V  
 C8 4.7 μF X 25V  
 C9 .47 μF X 50V  
 C10 47 pF  
 C11 .47 μF X 50V  
 C12 10 μF X 16V  
 C13 .047 μF  
 C14 2200 μF X 16V  
 C15 1000 μF X 16V  
 C16 .47 μF X 50V  
 C17 47 μF X 10V  
 C18 .47 μF X 50V  
 C19 .1 μF  
 C20 100 pF  
 C21 100 pF  
 C22 100 pF  
 C23 100 pF  
 C24 10 μF X 16V  
 U1 86A808  
 U2 86A8818  
 U3 86A8819  
 U4  
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 D1 86A415  
 D2 86A415  
 D3  
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 D5 86A415  
 D6  
 D7 86D422  
 S1 GAIN  
 S2 POWER  
 S3 LIMITER  
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**A5000-11-3**

- NOTES 1  
 1. RESISTORS R3 THRU R20 1/4W 1% OTHERS 1/4W 5% UNLESS OTHERWISE SPECIFIED.  
 2. ALL CAPACITORS IN μF AND 50V OR MORE UNLESS OTHERWISE SHOWN. ELECTROLYTIC CAPACITORS SHOWN IN μF X VOLTS.  
 3. THE FOLLOWING SYMBOLS DENOTE :  
 CHASSIS GROUND  
 P.C. BOARD GROUND  
 D.C. VOLTAGE  
 A.C. VOLTAGE