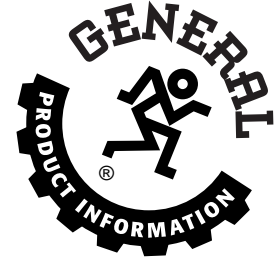


FR FAST RECOVERY SERIES™ M-1400i

FAST RECOVERY SERIES HIGH CURRENT POWER AMPLIFIER

The world is full of amplifiers that do one thing – amplify audio signals. But at Mackie Designs, we've always put out the extra effort to provide more quality and more features than our competitors while maintaining a comparable (or lower) price.

The FR Series™ power amplifiers are designed to perform reliably under the most adverse conditions, and we've added a bundle of extra features, so you don't have to put out the extra bucks to buy a bunch of add-ons or plug-ins to make your sound system do what you want it to do.



with Architects and Engineers Specifications

FEATURES

- Fast Recovery design for improved transient response and recovery from clipping
- Rack-mountable (2U) with rear support rails for extra support
- Separate left and right detented gain controls, calibrated in both dB and volts
- Balanced XLR and 1/4" TRS input jacks
- Balanced XLR thru jacks
- Heavy-duty binding post output jacks in parallel with 1/4" TS output jacks
- 6 LED metering including Signal Present and Overload
- Four levels of protection circuitry
 - 1) Automatic turn-on delay to prevent thumps and pops from reaching your speakers
 - 2) Short-circuit protection with separate L/R indicating LEDs
 - 3) Thermal protection with combined CH1 and CH2 Cold and Hot indicating LEDs
 - 4) SCR Crowbar DC offset protection
- Low-cut filter with variable frequency control (Off – 170Hz)
- Infrasonic¹ stabilization eliminates ultra-low-frequency noise caused by microphone handling, stage rumble
- Constant directivity horn compensation with variable high-frequency boost control (2kHz to 6kHz)
- Amp Mode switch for Stereo, Mono, or Bridge modes
- Limiter to eliminate clipping in both channels

¹a.k.a. Subsonic.

MORE INFORMATION

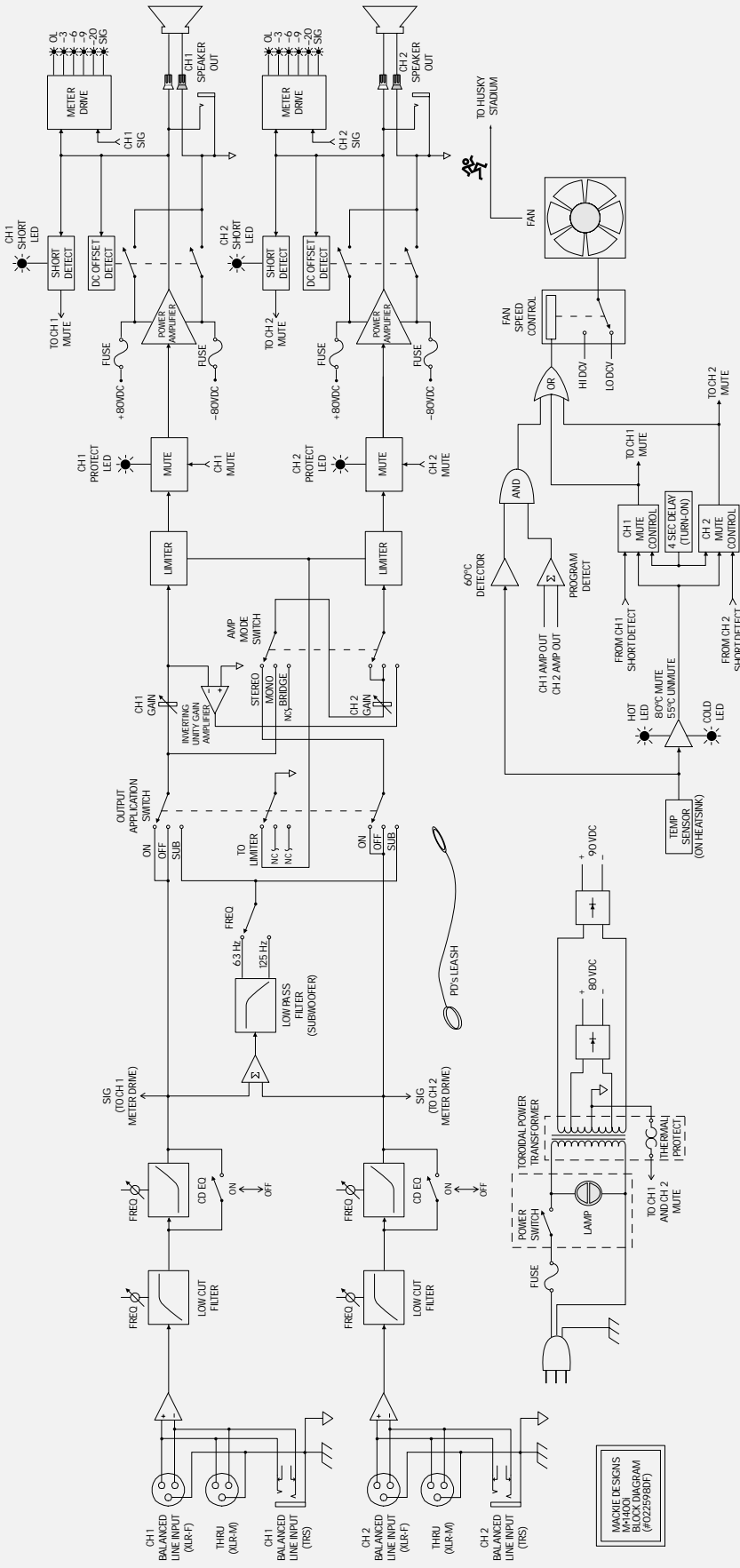
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■
"IN YOUR FACE"
ALL PRODUCT BROCHURE

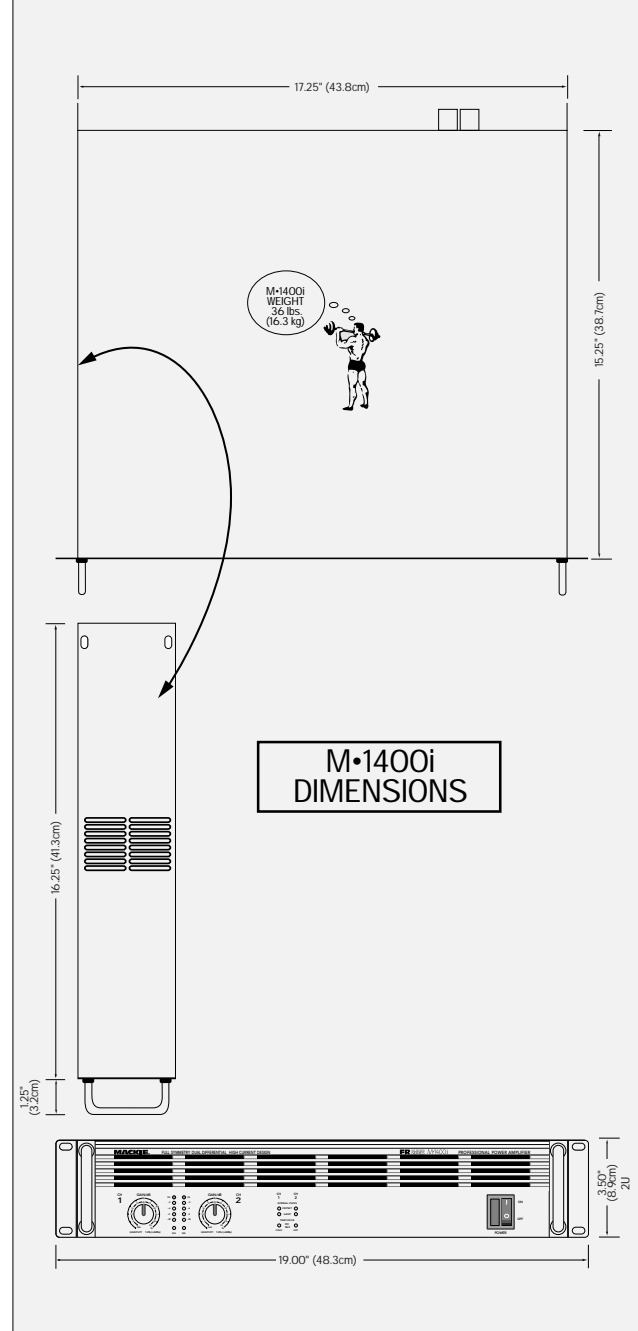
- Subwoofer mode switch with dual-frequency select (63Hz/125Hz)
- T-Design Constant Gradient Cooling Tunnel uses two short tunnels instead of one long tunnel for improved cooling efficiency and output device reliability
- Dual-speed cooling fan
- Toroidal transformer for reduced EMI emissions



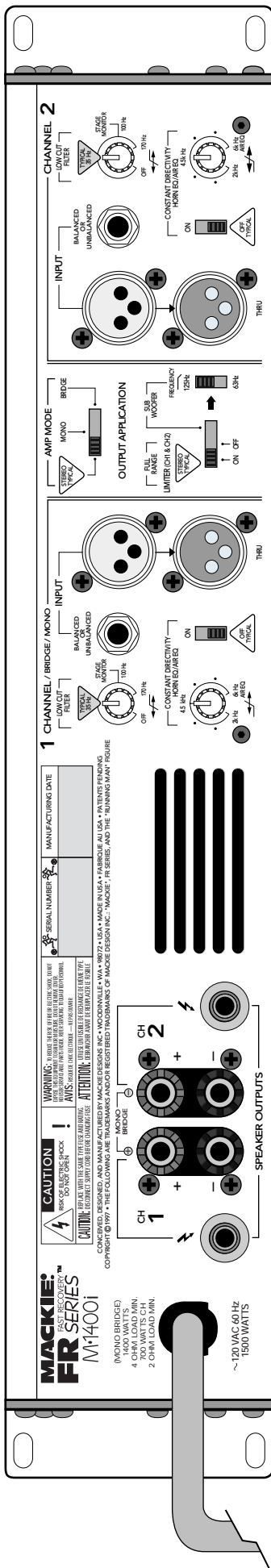
BLOCK DIAGRAM



DIMENSIONS



SPECIFICATIONS



Continuous Average Output Power, both channels driven:

250 watts per channel into 8 ohms from 20Hz to 20kHz, with no more than 0.012% THD
 425 watts per channel into 4 ohms from 20Hz to 20kHz, with no more than 0.025% THD
 630 watts per channel into 2 ohms from 20Hz to 20kHz, with no more than 0.050% THD

Bridged mono operation:

850 watts into 8 ohms from 20Hz to 20kHz, with no more than 0.025% THD
 1260 watts into 4 ohms from 20Hz to 20kHz, with no more than 0.050% THD

Maximum Power at 1% THD (per IHF-A-202):

300 watts per channel into 8Ω
 500 watts per channel into 4Ω
 700 watts per channel into 2Ω
 1000 watts into 8Ω bridged
 1400 watts into 4Ω bridged

Power Bandwidth:

20Hz to 70kHz (+0, -3dB)

Frequency Response:

20Hz to 40kHz (+0, -1dB)
 10Hz to 70kHz (+0, -3dB)

Distortion:

THD, SMPTE IMD, TIM
 < 0.025% @ 8Ω
 < 0.050% @ 4Ω
 < 0.150% @ 2Ω

Signal to Noise Ratio:

> 107dB below rated power into 4 ohms

Channel Separation:

> 80dB @ 1kHz

Damping Factor:

> 350 from 0 to 400Hz

Input Impedance:

20kΩ balanced bridging

Input Sensitivity:

1.23 volts (+4dBu) for rated power into 4 ohms

Gain:

30.25dB (32.5V/V)

Maximum Input Level:

9.75 volts (+22dBu)

Rise Time:

< 4.4μs

Slew Rate:

Voltage Slew Rate > 50V/μs
 > 100V/μs bridged
 Current Slew Rate > 32A/μs at 2Ω

CMRR:

> 40dB, 20Hz to 20kHz

Transient Recovery:

< 1μs for 20dB overdrive @ 1kHz

High Frequency Overload and Latching:

No latch up at any frequency or level

Variable Low-Cut Filter:

10Hz (Off) to 170Hz, 2nd Order Bessel

Subwoofer Low-Pass Filter:

Switched: 63Hz/125Hz, 3rd Order Bessel

Constant Directivity High Frequency Boost:

2kHz to 6kHz (+3dB points)
 6dB/octave high-frequency shelving filter, (shelving occurs at approximately 30kHz)

Turn On Delay:

3 seconds

Limiter Section:

Channel independent complementary positive and negative peak detecting

Indicators:

Six meter LEDs per channel:
 SIG (Signal Present), -20, -9, -6, -3, OL (Overload)
 CH 1 & 2
 PROTECT LEDs
 SHORT LEDs
 TEMP STATUS
 COLD, HOT LEDs

Power Consumption:

65 watts at idle	0.9A
550 watts with musical program fully loaded (4Ω per side, or 8Ω bridged)	6.7A
900 watts with musical program fully loaded (2Ω per side, or 4Ω bridged)	10.5A
850 watts at full power into 8Ω (cont. sine wave)	9.6A
1500 watts at full power into 4Ω (cont. sine wave)	15.6A
2500 watts at full power into 2Ω (cont. sine wave)	24.8A

AC Line Power:

120VAC, 60Hz

AC Drop-out Voltage:

At approximately 50% of rated line voltage

Physical:

Height: 2U = 3.5" (89mm)
 Width: 19.0" (483mm)
 Depth: 15.25" (387mm)
 Handle Depth: 1.25" (32mm)
 Overall Depth: 16.25" (413mm)
 Weight: 36 lbs (16.3kg)

Mackie Designs Inc. is engaged in a continuous program of product evaluation and improvement and reserves the right to change product specifications at any time without notice.

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ARCHITECTS AND ENGINEERS SPECIFICATIONS

1. GENERAL. The amplifier shall have a free-standing frame with front and rear brackets for rack-mounting, and supplied with four resilient feet suitable for table-top placement. The amplifier shall be capable of two-channel operation, with a switch to place the amplifier into single-channel operation by bridging the outputs of the two channels.

2. POWER OUTPUT. The power amplifier, being of two channels, shall deliver a *rated* continuous average sine wave power output over a 20Hz to 20kHz bandwidth of 250 watts RMS into 8 ohms per channel, 425 watts into 4 ohms, and 630 watts into 2 ohms with both channels operating, with no more than 0.05% total harmonic distortion. In single-channel operation it shall deliver 850 watts RMS into 8 ohms and 1260 watts into 4 ohms, with no more than 0.05% total harmonic distortion.

The power amplifier shall deliver a *maximum* continuous average sine wave power output over a 20Hz to 20kHz bandwidth of 300 watts RMS into 8 ohms per channel, 500 watts into 4 ohms, and 700 watts into 2 ohms with both channels operating, with no more than 1% total harmonic distortion. In single-channel operation it shall deliver 1000 watts RMS into 8 ohms and 1400 watts into 4 ohms, with no more than 1% total harmonic distortion.

3. POWER SUPPLIES. All necessary operating voltages for the amplifier shall be provided by an internal power supply. A master power switch shall be located on the front panel along with a green power-indicating light.

4. INPUT CHANNEL CONNECTIONS. Each monaural input channel shall have an electronically balanced line-level input, presenting no less than a 20k ohm impedance to the source. Each input shall have an input sensitivity of +4dBu, requiring no more than 1.23V rms to be driven to rated output into a 4 ohm load. The input connector shall appear on the rear panel as a female XLR-3

type connector. In addition, each monaural input channel shall have a parallel 1/4" TRS phone jack and a male XLR-3 type connector, which can be used as inputs or "thru" jacks for daisy-chaining the input signal to another amplifier. Pin 2 of the XLR connectors, and the tip of the 1/4" TRS phone jack, shall be non-inverting.

5. INPUT CHANNEL LEVEL CONTROLS. Each monaural input channel shall be equipped with a gain control appearing on the front panel, each having 40 detent positions, and calibrated in dB and volts.

6. FRONT PANEL INDICATORS. Each channel shall have an associated six-segment LED meter appearing on the front panel, capable of displaying signal present, -20dB, -9dB, -6dB, -3dB, and overload. Each channel shall have internal status LEDs appearing on the front panel to indicate activation of protect mode and short-circuit protection. Two temperature status LEDs shall appear on the front panel, one to indicate normal operation (COLD) and one to indicate thermal protection (HOT).

7. PROTECTION FEATURES. The amplifier shall provide delayed activation of the outputs at turn-on. Each channel shall have a short-circuit protection circuit for detecting excessive current flow at the output that, when activated, mutes the output for four seconds. The short-circuit protection shall continuously cycle on and off until the shorted condition is remedied. The amplifier shall have a thermal protection circuit to protect the power devices from over-temperature operation. The circuit shall activate when the internal temperature crosses the safe-operating threshold and,

when activated, mute the outputs until the internal temperature cools to a safe-operating temperature, at which time the amplifier shall resume normal operation. The amplifier shall have a fan to cool the heat-producing internal components, drawing cool air in from the front, and exhausting warm air out through both sides. The fan shall operate at two speeds, the speed being determined by the internal temperature and the signal level present at the output. The amplifier shall have an SCR crowbar circuit to protect the speakers against a catastrophic amplifier failure. The circuit shall activate in the presence of continuous DC at the speaker outputs, and shall shut the amplifier down by turning off the high-voltage rails.

8. OUTPUT CONNECTIONS. Each channel shall have a heavy-duty 5-way binding post speaker output connector appearing on the rear panel, with 3/4" spacing for accommodating standard double banana plugs as well as spade lugs or bare wires. Each channel shall have a 1/4" TS phone speaker output jack appearing on the rear panel in parallel with the binding post output.

9. AMP MODES. The amplifier shall have a three-way switch appearing on the rear panel for selecting the mode of operation, which shall include stereo (two channels in, two channels out), mono (one channel in, two channels out), and bridge (one channel in, one channel out, bridged between both speaker outputs).

10. OUTPUT APPLICATION. The amplifier shall have a three-way switch appearing on the rear panel for selecting between limiter on, limiter off, and subwoofer mode. The

defeatable electronic limiter circuit shall sense the onset of clipping and shall limit the input signal and thereby prevent the output from clipping. The amplifier shall have a two-way switch appearing on the rear panel for selecting between a 63Hz and 125Hz low-pass cutoff frequency when subwoofer mode is selected.

11. LOW-CUT FILTER. Each channel shall have a low-cut filter with a variable frequency control appearing on the rear panel covering a range of 10Hz (OFF) to 170Hz.

12. CONSTANT DIRECTIVITY HORN EQ. Each channel shall have a two-way switch appearing on the rear panel for selecting a constant directivity horn equalization circuit. When selected, this circuit shall provide a 6dB per octave high frequency boost. The EQ shall have a variable frequency control appearing on the rear panel covering a range of 2kHz to 6kHz. The 6kHz position shall be called AIR.

13. PHYSICAL CONFIGURATION. The amplifier shall be rack-mountable with rear support rails for extra support, and shall have a steel chassis frame painted grey-black. The amplifier shall be 19" wide (483mm), 3.5" (2U) tall (89mm), and 15.25" deep (387mm), and shall weigh 36 pounds (16.3kg).

14. DESIGNATION. The power amplifier shall be a Mackie Designs M-1400i.

MACKIE®

MACKIE DESIGNS INCORPORATED

16220 Wood-Red Rd. NE

Woodinville • WA • 98072 • USA

Toll-Free 800/258-6883 • FAX 425/487-4337 • E-mail: sales@mackie.com

www.mackie.com

