

M•1400/M•1400i

■ The Mackie M•1400/M•1400i is a dual channel, high output power amplifier that incorporates a number of unique features including FR “Fast Recovery” design, high continuous-current output, built-in subwoofer crossovers, and a T-Design constant-gradient cooling tunnel for improved cooling efficiency and output device reliability.

■ The M•1400/M•1400i is rated at a continuous output of 250 watts per channel into 8Ω, 425 watts per channel into 4Ω and 630 watts into 2Ω. In bridge mode the M•1400/M•1400i is rated at 850 watts into 8Ω and 1260 watts into 4Ω. Variable low-cut filters on each channel, with a range from off to 170Hz, enable tighter bass response and a Constant Directivity Horn EQ improves high-frequency reproduction. The CD Horn EQ is 6 dB/octave and its “knee” position is sweepable from 2kHz to 6kHz. The built-in limiter is channel independent and helps eliminate clipping. Inputs are balanced/unbalanced 1/4" and XLR, and XLR thru connectors allow the full-range signal to be routed to another M•1400/M•1400i. Speaker connections on the M•1400 are Speakon® and binding posts, while speaker connections on the M•1400i are 1/4" and binding posts.

■ To effectively deal with clipping, an amplifier must be able to recover almost instantaneously. That is the definition of “Fast Recovery”. Rather than using negative feedback to help control clipping distortion, the M•1400/M•1400i employs a very sparse amount of negative feedback. The use of Baker Clamp circuits on the positive and negative voltage amp stages prevents saturation (and latching) during periods of overdrive. In addition, a transistor senses when the Baker Clamp is active and activates the internal limiting circuits. This results in no latching, instant recovery from overdriving the amp, and a superior sound.

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High-Current Power Amplifier



Features

- 1400 watts max, 1260 watts continuous @ 4 ohms bridged
- Ultra-low-noise/low-distortion design
- Fast Recovery circuitry reduces distortion at clipping
- Two 2nd order, 12 dB/octave, Bessel low-cut filters with variable frequency from Off to 170Hz
- Constant directivity horn EQ/Air EQ with variable frequency from 2kHz to 6kHz and on/off switch
- Limiter with on/off switch
- Balanced/unbalanced 1/4" and XLR inputs
- XLR thru outputs
- 1/4" jacks (M•1400i) or Speakon® (M•1400) connectors and 5-way binding post outputs (both models)
- Detented gain controls calibrated in dB and volts
- Signal present and OL LEDs
- Channel Status LEDs
- Superior T-Design cooling
- Five-year, limited warranty (U.S. only)

RELATED PRODUCTS

M•800/M•2600 Power Amplifiers, 1202-VLZ PRO 12-Channel Mic/Line Mixer, 1402-VLZ PRO 14-Channel Mic/Line Mixer, 1604 VLZ PRO 16-Channel Mic/Line Mixer, 1642-VLZ PRO 16-Channel Mic/Line Mixer, SR24•4-VLZ PRO 24 Channel Mic/Line Mixer, SR32•4-VLZ PRO 32 Channel Mic/Line Mixer, CFX Series 12, 16, and 20 Channel Mic/Line Mixer w/Digital Effects, C300 2-Way Loudspeaker, S500 2-Way Loudspeaker, SWA1501 and SWA1801 Active Subwoofers.

Applications

- Live sound/music reinforcement for churches, clubs, schools, conference centers, hotels
- High level A/V playback
- Large speech systems

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M•1400/1400i Specifications

Maximum Power at 1% THD:

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

Continuous Sine Wave 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

Power Bandwidth:

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

Frequency Response:

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

Distortion:

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

Signal to Noise Ratio

>107 dB below rated power into 4 ohms

Channel Separation:

>80 dB @ 1kHz

Damping Factor:

>350 from 0 to 400Hz

Input Impedance:

20kΩ balanced bridging

Input Sensitivity:

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

Voltage Gain:

30.25 dB (32.5V/V)

Maximum Input Level:

9.75 volts (+22 dBu)

Rise Time:

<4.4μs

Slew Rate:

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

CMRR:

>40 dB, 20Hz to 20kHz

Transient Recovery:

1μs for 20 dB overdrive at 1kHz

High Frequency Overload and Latching:

No latch up to 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 (+3 dB points)
 6 dB/octave high-frequency shelving filter, (shelving occurs at approximately 30kHz)

Limiter Section:

Complementary Positive and Negative Peak Detecting

Indicators:

6 meter LEDs per channel
 SIG (Signal Present), -20, -9, -6, -3, OL (Overload)
 PROTECT LEDs, CH1 & 2
 SHORT LEDs, CH1 & 2
 TEMP STATUS
 COLD/HOT LEDs

Power Consumption:

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

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AC Line Power:

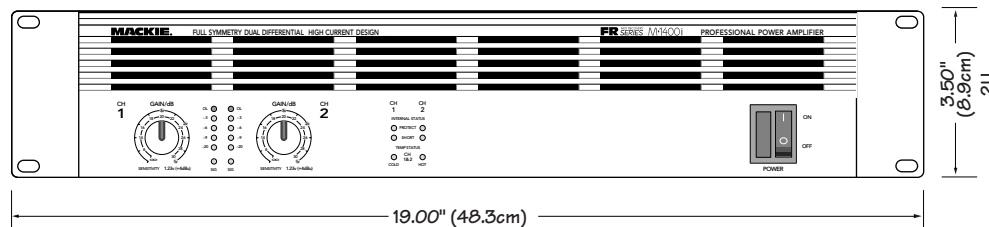
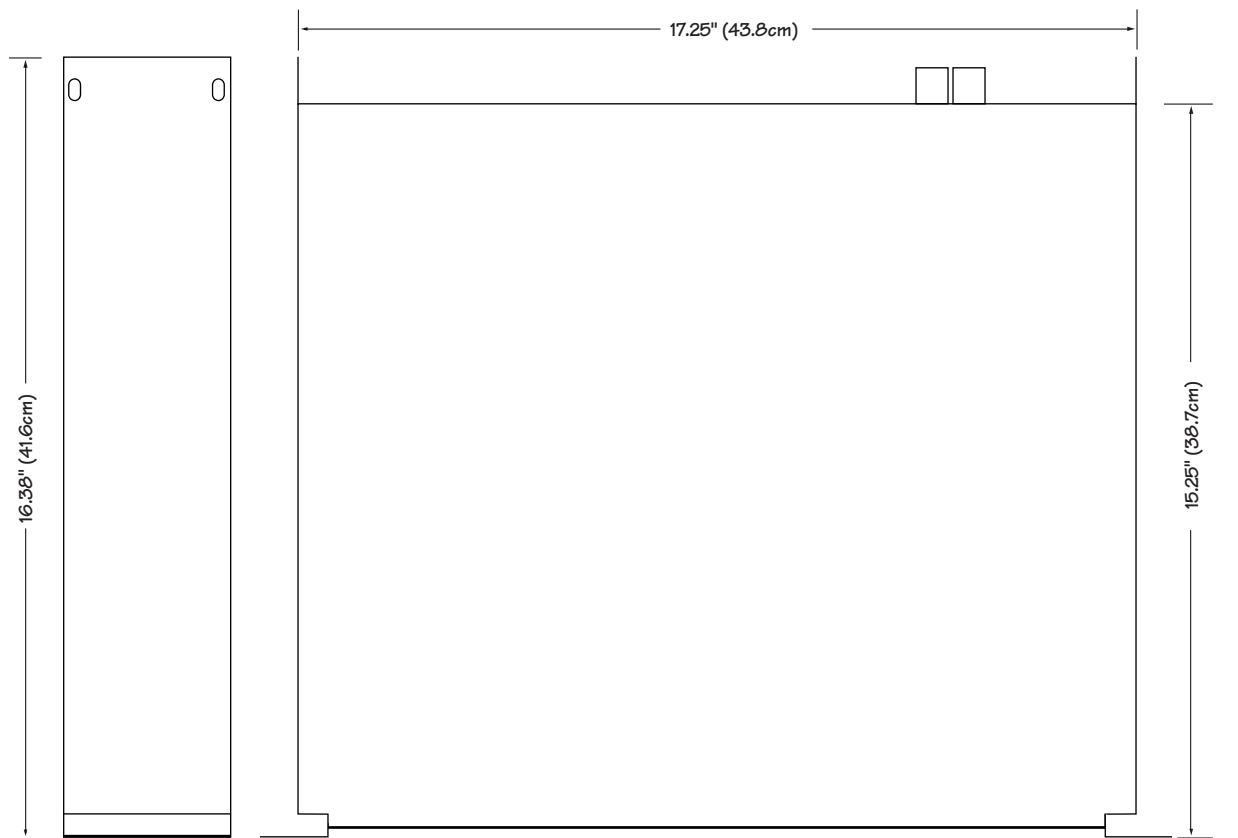
US (M•1400 and M•1400i)	120 VAC, 60Hz
Europe (M•1400 only)	240 VAC, 50/60Hz
Japan (M•1400 only)	100 VAC, 50/60Hz
Korea (M•1400 only)	220 VAC, 60Hz

AC Drop-out Voltage:

At approximately 63% of rated line voltage

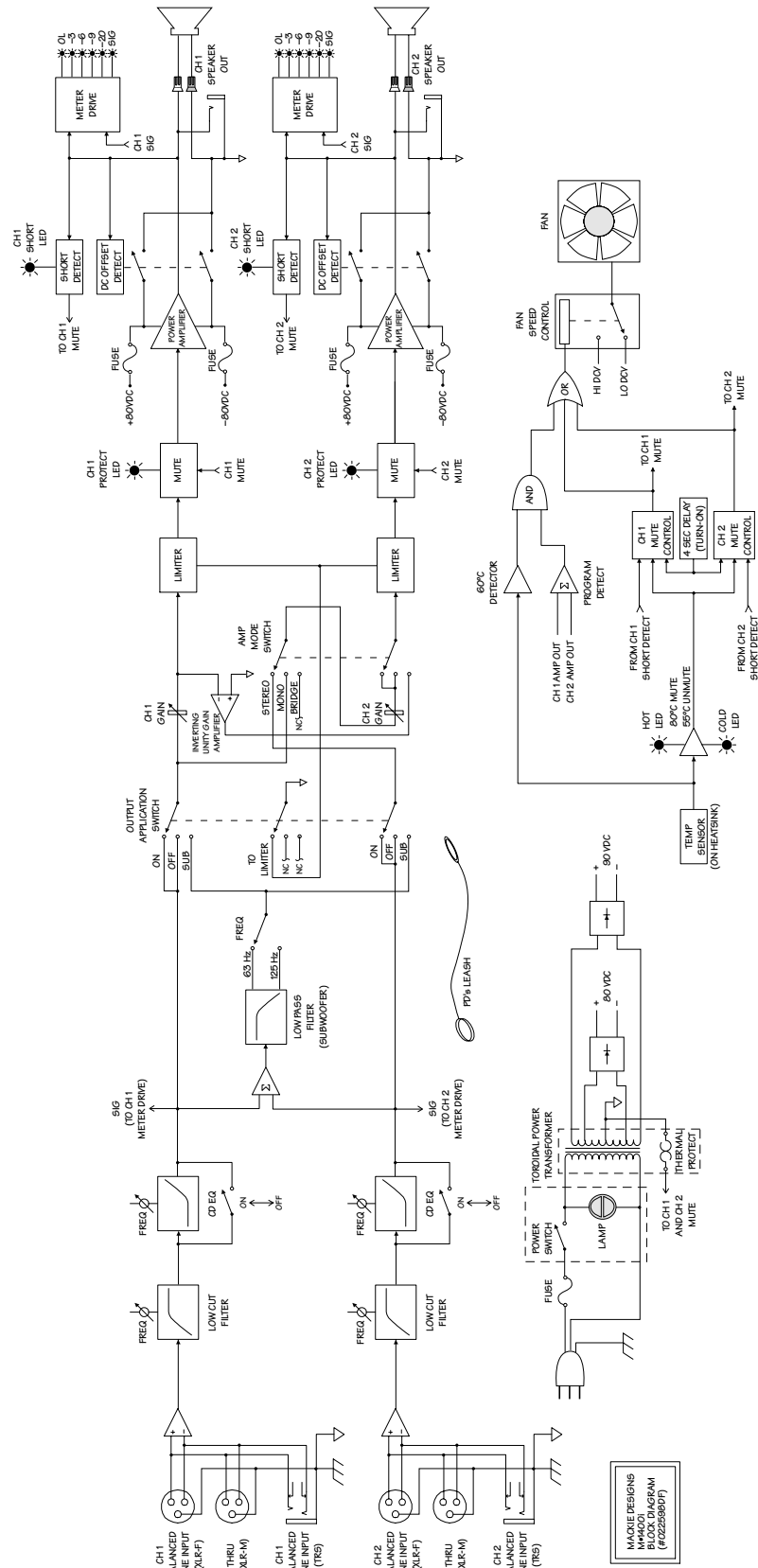
Physical:

Height	3.50" (89 mm)
Width	19.00" (483 mm)
Depth	15.25" (387 mm)
Overall Depth	16.38" (416 mm)
Weight	36 lbs (16.3 kg)



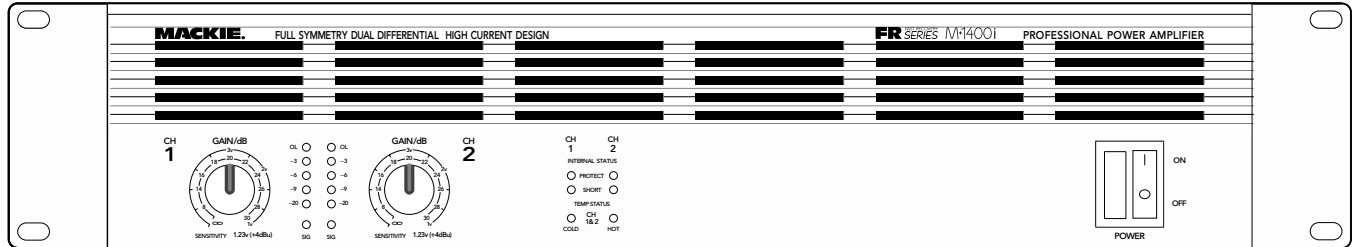
M•1400/M•1400i High-Current Power Amplifier

M•1400/M•1400i Block Diagram

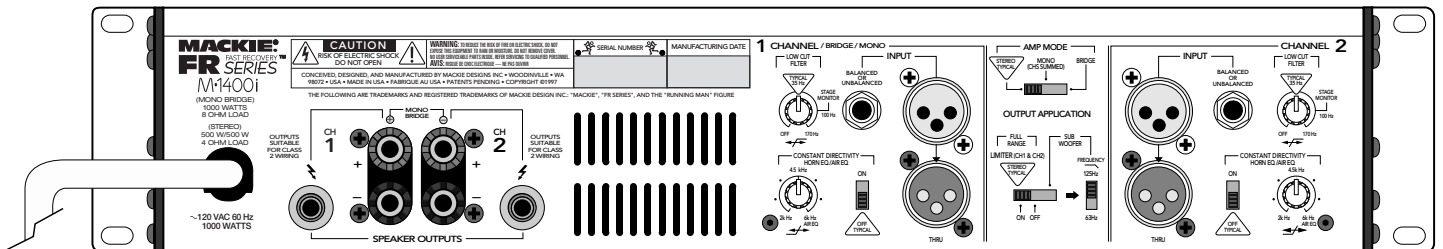


M•1400/M•1400i High-Current Power Amplifier

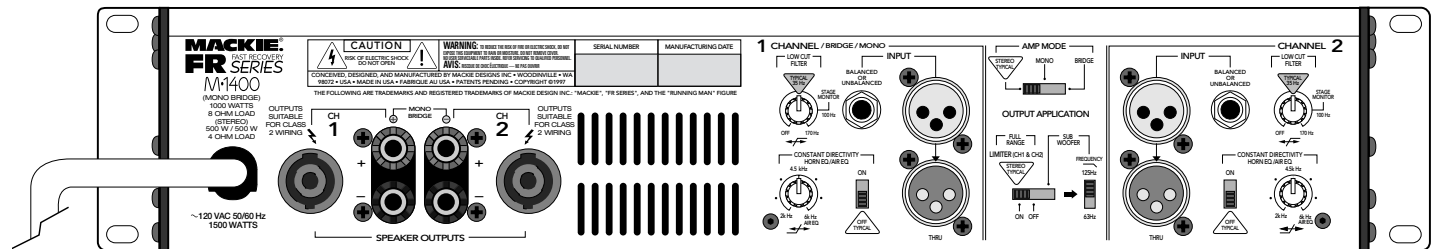
M•1400/M•1400i Front Panel



M•1400i Rear Panel



M•1400 Rear Panel



M•1400/M•1400i

High-Current Power Amplifier

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 two-channel power amplifier 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 at mid-band 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 +4 dBu, 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 20 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, -20 dB, -9 dB, -6 dB, -3 dB, 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 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. M•1400i: 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.

M•1400: 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 (120V versions only) as well as spade lugs or bare wires. Each channel shall have a Neutrik brand Speakon® 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 APPLICATIONS. The amplifier shall have a three-way switch appearing on the rear panel for

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AMPLIFIER

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selecting 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

6 dB 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 gray-black. The amplifier shall be 19" wide (483mm), 3.5" (2U) tall (89mm), and 15.25" deep (387mm), and shall weigh 36 pounds (16.3 kg).

14. DESIGNATION. The power amplifiers shall be a Mackie Designs M•1400 and M1400i.

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- The M•1400/1400i uses a unique T-Design constant-gradient cooling tunnel that draws air in through the front of the amplifier and forces it out through the amplifier's sides. The T-Tunnel design provides a shorter, more direct path for cool air. This allows for reduced heat build up and cooler transistor operation.
- The amplifier has a subwoofer mode that allows you to turn on the built-in subwoofer crossover. When activated, the signals appearing at the left and right inputs are summed, directed to a low-pass filter, and routed to both output stages. The inputs are summed regardless of stereo, mono, or bridge amp mode selection. A switch selects the cutoff frequency of the filter at either 63Hz or 125Hz.

Electronic files for this product available at:
www.mackie.com

This Specification Sheet	M1400_SS.PDF
Owner/Operator's Manual	M1400_OM.PDF
CADD files	M1400.DXF

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