

## Model 7600M/7602M Wideband Power Amplifiers

- Output Power: 17 Watts/34Watts
- Output Voltage: 141V/282V rms
- Frequency Range: DC to 1MHz
- Coupling: AC or DC
- Gain: up to 42dB
- Distortion: <0.01%
- DC Offset:  $\pm 200V$
- Load Impedance: Reactive and Resistive



### DESCRIPTION

The Krohn-Hite Models 7600M and 7602M are 17 and 34 watt, wideband power amplifiers that offer extended output power and voltage capabilities, low distortion, versatility and the latest in hybrid CMOS power operational amplifier technology with performance features not available in other power amplifiers.

### MODEL 7600M

The Models 7600M provide 17 watts of continuous power (34 watts at dc) and 141V rms from dc to 500kHz. The frequency response of the 7600 is  $\pm 0.1$ dB to 10kHz, and the distortion contributed by the amplifier is <0.01% to 5kHz and <0.3% to 100kHz. The voltage gain can be either inverting or non-inverting and has selectable ranges from 0dB-14dB, 0dB-28dB and 0dB-42dB, and is continuously variable between ranges.

Other features include: modes of A, A-B and -B, common mode rejection of 80dB, input coupling of ac or dc, dc offset control that is variable from 0V to  $\pm 200V$ ; an optional meter package that provides a meter for displaying the heat sink temperature in  $^{\circ}C$ , output peak voltage and average output current.

### MODEL 7602M

The Model 7602M provides the same performance as the Model 7600M with a differential output and is able to deliver 34 watts of continuous power (68 watts at dc) and 282V rms (800Vp-p). It can also provide plus and minus dc voltages simultaneously.

### APPLICATIONS

The Models 7600M and 7602M are two of the only amplifiers on the market today that offer a combination of power, performance and versatility over the range of dc to 1MHz.

With the ability to drive either resistive or reactive loads, together with its power and voltage capability, low distortion, and flat response make the Models 7600M and 7602M ideally suited for applications such as driving piezo electric transducers, ion beam deflection, vacuum tube driver, meter calibration, ink jet testing and design; and with the dc coupling and variable dc offset control each amplifier can function as a bipolar high voltage power supply.

**SPECIFICATIONS****OUTPUT (All rms values are for sinewave signals)**

For the Model 7602M, specifications apply to each output to ground.

**Frequency Range:** dc to 1MHz.

**Power:**

**1k Ohm Load:** 17W rms, 34W dc and peak, dc to 500kHz; 5W rms to 1MHz.

**600 Ohm Load:** 10W rms, 100Hz to 1MHz; 5W rms, 10W dc and peak, dc to 100Hz.

**Voltage:**

**No Load:**  $\pm 200V$  dc and peak, 141V rms.

**1k Ohm Load:**  $\pm 184V$  dc and peak, 130V rms, dc to 500kHz;  $\pm 113V$  peak, 80V rms at 1MHz.

**600 Ohm Load:**  $\pm 113V$  peak, 80V rms, 100Hz to 1MHz;  $\pm 78V$  dc and peak, 55V rms, dc to 100Hz.

**Current:** 910 ohm load,  $\pm 200mA$  peak, 141mA rms, dc to 500kHz.

**Frequency Response:**  $\pm 0.1dB$ , dc to 10kHz;  $\pm 0.25dB$  to 200kHz;  $\pm 0.5dB$  to 500kHz, 0-130V rms;  $\pm 0.5dB$  to 1MHz 0-80V rms.

**Harmonic Distortion:**  $<0.01\%$  to 5kHz and 175V peak output,  $<0.05\%$  200V peak output;  $<0.3\%$  to 100kHz.

**Voltage Gain:** 0dB to 42dB in three ranges; 0dB to 14dB, 14dB to 28dB, 28dB to 42dB; continuously variable between ranges.

**Step Accuracy:**  $\pm 0.1dB$  plus frequency response specification. Gain steps are 14dB or a voltage gain of 5.

**Stability:**  $<0.001dB$  change for a 10% change in line voltage.

**Dynamic Range:**  $>80dB$ .

**Hum and Noise (2MHz bandwidth):** Referred to output,  $<10mV$  rms;  $<20mV$  rms on the 28dB to 42dB gain range.

**Phase Shift:** A input  $0^\circ \pm 1^\circ$ , B input,  $180^\circ \pm 1^\circ$  dc to 10kHz increasing linearly  $60^\circ$  lagging at 1MHz. Model 7602: (Inverted output relative to non-inverted)  $180^\circ$ ,  $-0.3^\circ$  at 10kHz;  $180^\circ$ ,  $-3^\circ$  at 100kHz;  $180^\circ$ ,  $-20^\circ$  at 1MHz.

**Squarewave Response:**

**Rise/Fall Times:** 120ns to 50Vp-p.

**Slew Rate:**  $>600V/\mu s$ , 400Vp-p.

**Aberrations:**  $<5\%$ .

**Regulation:**  $<0.1\%$ , No load to 1k ohm load from dc to 10kHz; rising to 2% at 1MHz.

**Coupling:** DC.

**DC Level:** Nominal zero volts; vs. temperature,  $2mV/^\circ C$ .

**DC Offset Control (no load):** 0V to  $\pm 200V$ .

**DC Level Stability:**

**Vs. Line:**  $<1mV$  for a 10% change in line voltage.

**Vs. Temperature:**  $<0.01\%/^\circ C$  or  $2mV/^\circ C$  whichever is greater.

**Internal Impedance:**  $<0.5$  ohm, dc to 10kHz; 5 ohms at 100kHz; 20 ohms at 1MHz.

**Output Protection:** Protected from overloads with a unique foldback limiter which keeps the output current within safe operating regions. Kickback diodes clamp kickback voltages to the supply.

**INPUT**

**Modes:** A, A-B, -B.

**Maximum Voltage (without damage):**  $\pm 200V$  dc referred to ground.

**Maximum Common Mode:** 0dB to 14dB range,  $\pm 200V$  peak; 14dB to 28dB range,  $\pm 40V$  peak; 28dB to 42dB range,  $\pm 8V$  peak.

**Common Mode Rejection:** 80dB, dc to 200Hz; 60dB to 1kHz; 40dB to 10kHz; rising to 20dB at 1MHz.

Sensitivity:  $\pm 1.6V$  peak.

**Coupling:** Direct (dc) or capacitive (ac) with low frequency cutoff of approximately 1Hz.

**Impedance:** 1M ohm in parallel with 30pF with front inputs only; 65pF with front and optional rear inputs, independent of input gain setting.

**GENERAL****7600M/7602M: Metering**

**Heat Sink Temp  $^\circ C$ :** Measures the heat sink temperature in the vicinity of the output power amplifier IC

Used as an indicator of operating conditions and air flow to the unit.

**Output Peak Voltage:** Measures the largest peak voltage independent of polarity with a 1 second time constant. Accuracy (at 1kHz):  $\pm 0.5V$ .

**Frequency Response:**  $\pm 2\%$ , 10Hz to 100kHz; 5% to 1MHz.

**Average Output Current:** Measures average dc supply current delivered to the output amplifier as an indicator of output amplifier load. Quiescent current is nulled out. Can be used to find resonances in a load.

**Front Panel Warning LED Indicators:** Over TEMP., output H.V. (high voltage).

**Load Impedance:** Capable of driving any resistive load within the current and voltage limitations of the amplifiers foldback limiter. Capable of driving reactive loads within voltage and current limitations.

**Temperature Range:**  $0^\circ C$  to  $45^\circ C$ .

**Controls, Terminals and Indicators:**

Front panel: Power switch, 5-position input MODE switch, 2-position INPUT COUPLING switch, 3-position

GAIN control switch, variable GAIN dB potentiometer, 10-turn variable DC OFFSET potentiometer,

3-position offset RANGE switch, output CONNECT/DISCONNECT switch.

**Rear Panel:** CHASSIS/FLOAT GROUND switch.

**Front Panel Warning LED Indicator:** CLIPPING.

**Terminals:** BNC A input, BNC B input, binding post output.

**Rear Panel:** Power receptacle, optional BNC input and binding post output.

**Power Requirements:** 90-132/198-264 volts, 50Hz-400Hz, 200 watts.

**Dimensions and Weights:** 3.5" (9cm) high, 8.5" (21.8cm) wide, 18" (46.2cm) deep; 12 lbs (5.4kg) net, 14 lbs (6.3kg) shipping.

**Accessories:** 3-terminal line cord, operating manual.

**OPTIONS**

**003:** Rear panel input and output connectors.

**015:** Remote Gain Control, VC Input  $\pm 10\text{Vdc}$ , gain is proportional to the VC input setting.

**Accuracy:**  $\pm 5\%$ ,  $\pm 1$  digit.

**Rack Mounting Kit:** Part No. RK-37, permits installation of the Models 7600/7602 into a standard 19" rack spacing.

**Extended 1 Year Warranty:** Part No. (7600) EW7600, (7600M) EW7600M, (7602) EW7602, (7602M) EW7602M.

**OPTIONAL ACCESSORIES**

**CAB-005:** Cable, Two Conductor Shielded Balance Line

**CAB-018:** Cable, Multi-stacking Double Banana plug

**CAB-023:** Cable Set, Low Thermal EMF Retractable Banana

**CAB-024:** Cable Set, Low Thermal EMF Spade Lug

**CAB-025:** Cable, BNC, 3ft, Low Noise

Specifications subject to change without notice.



Model 7602M Rear Panel

