

MODEL 1201 PROGRAMMABLE VOLTAGE PREAMPLIFIER

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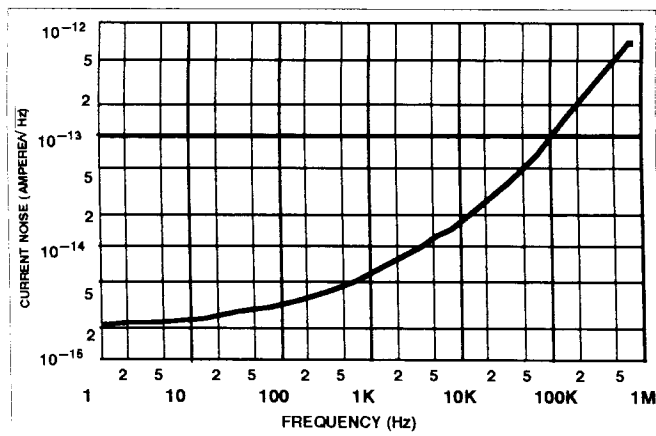
The Model 1201 Voltage Preamplifier with Remote Gain Programming Option (06) is usable in both computer controlled and manual applications requiring uncompromising performance. Gating and overload recovery in addition to gain control can be remotely programmed. In addition gain status, gain un-cal, overload and low pass and high pass filter status are available as outputs to the control device. The programming function operates under static external logic control. There exists no on-board microprocessor or other dynamic digital switching circuitry to interfere with low level analog signal inputs, either when the 1201 is controlled directly via computer digital I/O lines or via the Model 488A GPIB Coupler.

The 1201 features high impedance differential or single-ended input and superior common mode rejection performance with operation either in ac or dc coupled modes. Gain is selectable from 10 to 25,000 with accuracy of 1% and stability better than 0.03%/°C. Other features and capabilities include: dc stability 6 $\mu\text{V}/^\circ\text{C}$; CMRR above 125 dB; CM input to 10 V pk-pk; input leakage current <10 pA; frequency response to 400 kHz; distortion 0.01%; X1 output; 600 Ω outputs; Lo-Z output (to 25 mA); battery/line operation.

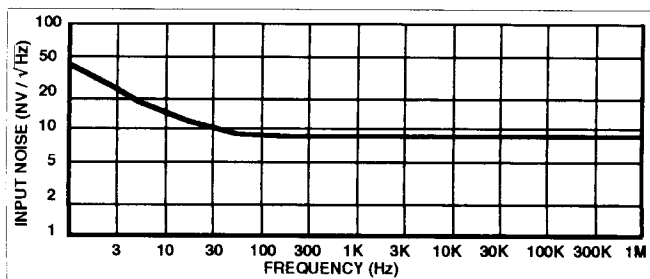
This high performance preamplifier is an excellent choice for a wide variety of application areas from evoked potential measurements to infrared radiometry.

The NiCad rechargeable battery pack is a standard feature. It allows the unit to operate on line power only, battery power only, or recharge while operating on line power. Fast charge and trickle charge rates are switch selectable.

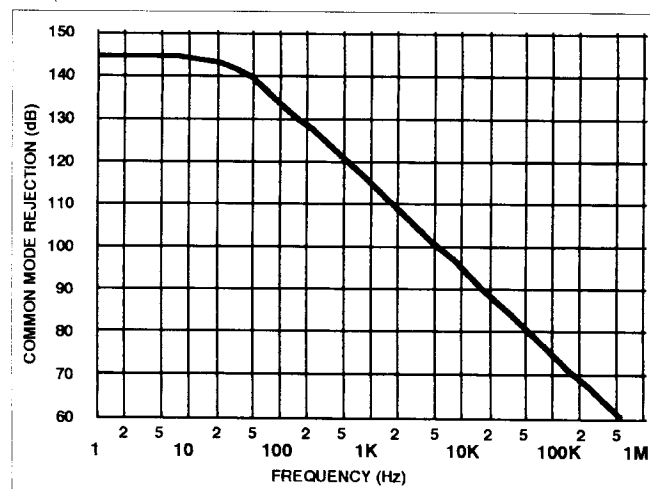
One or two units can be 19" rack mounted using optional RM-1 (dual unit) or RM-2 (single unit) hardware.



Model 1201 Noise Current Density Plot

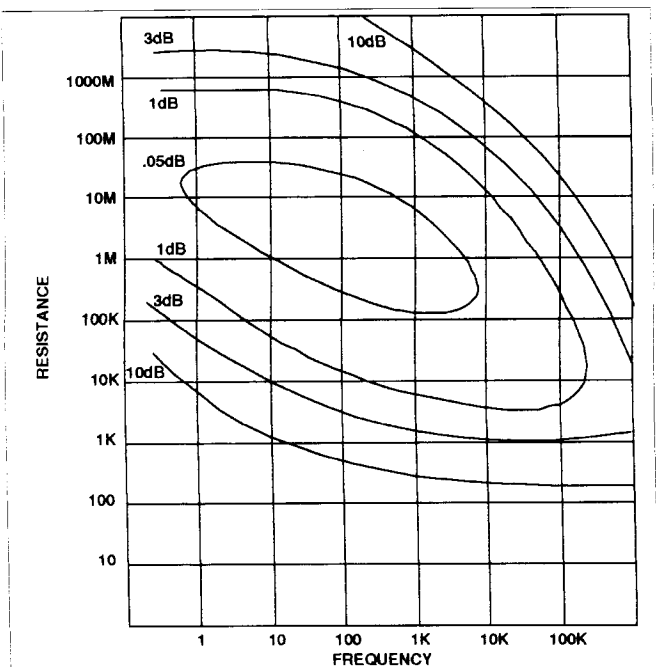


Model 1201 Noise Voltage Density Plot



Typical Common Mode Rejection

1201 PROGRAMMABLE VOLTAGE PREAMPLIFIER



Model 1201 Noise Contours

SPECIFICATIONS

INPUT IMPEDANCE dc Coupled Greater than 1 G Ω (1000 M Ω); typically 5 G Ω (5000 M Ω). ac Coupled 100 M Ω (each input BNC)

INPUT CURRENT Less than 10 pA, either input; less than 5 pA difference (offset) current.

INPUT FREQUENCY RESPONSE < 0.008 Hz (ac Coupled) to 400 kHz

dc STABILITY (vs Temperature) 6 $\mu\text{V}/^\circ\text{C}$ max, referred to input; 300 $\mu\text{V}/^\circ\text{C}$ max, referred to output.

dc STABILITY (vs Time) 20 $\mu\text{V}/24$ hr r.t.i., non-cumulative, maximum, after 1/2 hour warm-up.

MAXIMUM INPUT, COMMON MODE 10 V, pk-pk; 200 Vdc in ac mode

MAXIMUM INPUT, DIFFERENTIAL OR SINGLE-ENDED ± 750 mV (gains of X10 - X100); ± 75 mV (gains of X200 - X10K)

COMMON MODE REJECTION (Minimum)

Frequency	Gain > 200	Gain < 200
dc - 100 Hz	125 dB	115 dB
1 kHz	105 dB	95 dB
10 kHz	85 dB	75 dB
100 kHz	65 dB	55 dB
200 kHz	55 dB	45 dB
400 kHz	50 dB	40 dB

GAIN X10 to X10,000 in a 1-2-5-10 sequence; front panel potentiometer provides continuous gain to X25,000

GAIN ACCURACY Better than 1% when vernier is in CAL position

GAIN STABILITY Better than 0.03%/ $^\circ\text{C}$

DISTORTION Typically less than 0.01%

FREQUENCY RESPONSE dc Coupled dc to 400 kHz (-3 dB) with low pass switch in MAX position.

ac Coupled 0.008 Hz to 400 kHz (-3 dB) with low pass switch in MAX position

HIGH PASS FILTER (low frequency rolloff) Switch-selectable for dc or 0.03 Hz to 3 kHz, in a 1-3-10 sequence @ 6 dB/octave rolloff.

LOW PASS FILTER (high frequency rolloff) Switch-selectable from 3 Hz to 300 kHz and MAX in a 1-3-10 sequence @ 6 dB/octave rolloff; bandwidth in MAX position is 400 kHz min. at full output.

NOISE FIGURE Less than 0.4 dB at 10 Hz, with a 1 M Ω source impedance. Less than 0.04 dB at 1 kHz, with a 1 M Ω source impedance.

NOISE Less than 15 nV per Hz $^{-1/2}$ at 10 Hz. Less than 7 nV per Hz $^{-1/2}$ at 1 kHz. Less than 4 fA/ $\sqrt{\text{Hz}}$ below 100 Hz

OUTPUTS Four outputs (BNC) as follows:

- 600 Ω outputs (2)
- Lo-Z output (to 25 mA, 50 Ω)
- Unity-gain (X1) output

MAXIMUM OUTPUT VOLTAGE (battery operation)

- 600 Ω outputs: 12 V pk-pk, min.
- Lo-Z output: 10 V pk-pk min., up to 25 mA
- Unity-gain (X1) output: 1.3 V pk-pk, min., up to 7 mA

MAXIMUM OUTPUT VOLTAGE (line operation)

- 600 Ω outputs: 20 V pk-pk, min.
- Lo-Z output: 18 V pk-pk min., up to 25 mA
- Unity-gain (X1) output: 2 V pk-pk, min., up to 7 mA

BATTERY CHARGE TIME <15 hr

BATTERY OPERATION TIME >25 hr

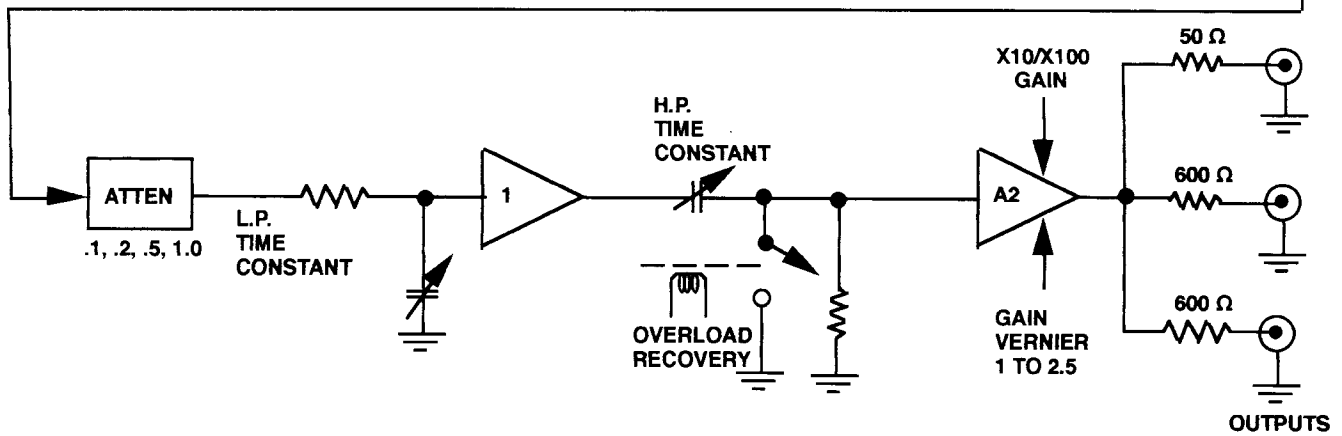
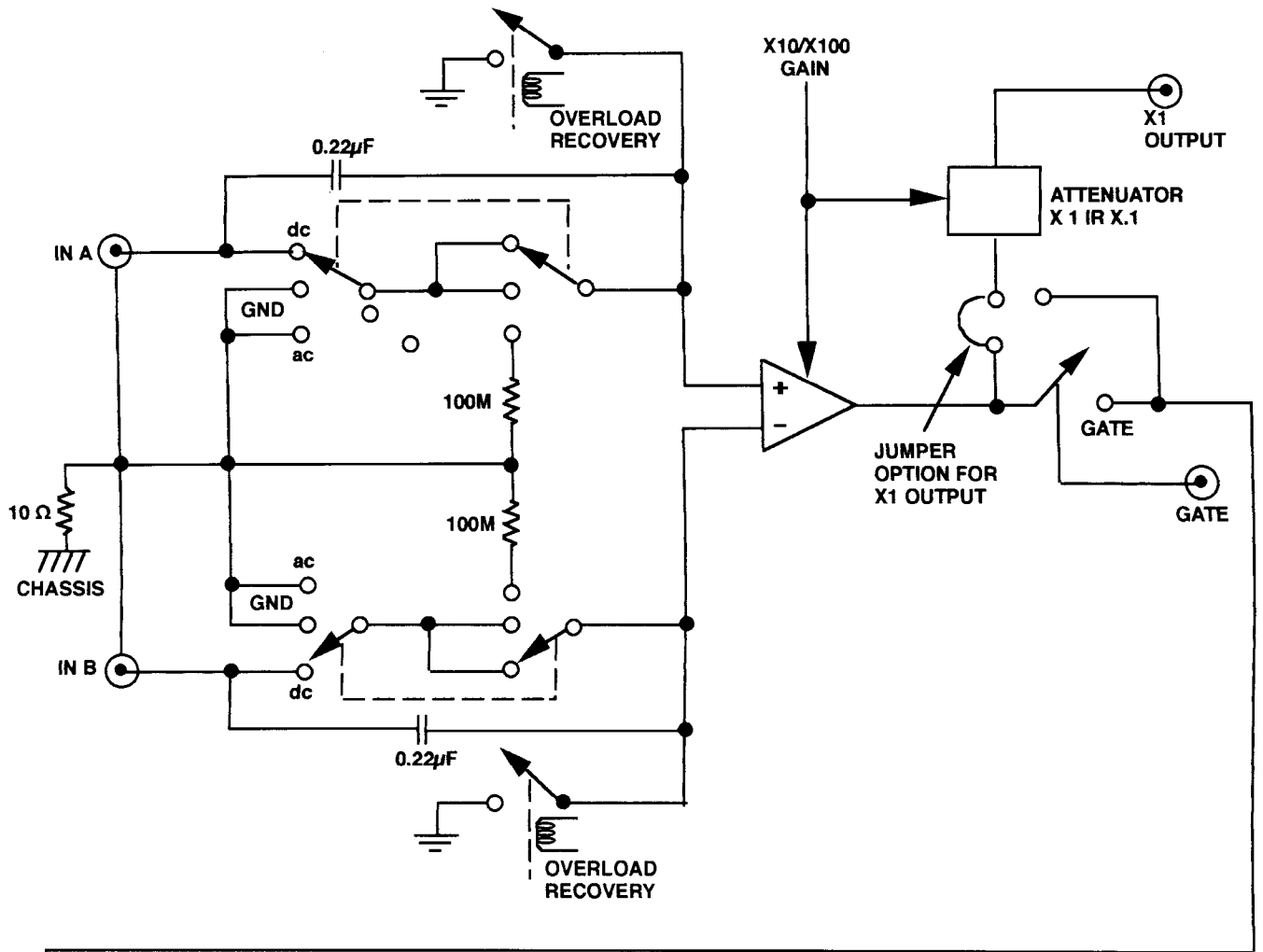
GATED OPERATION Preamplifier may be gated with external input (rear panel BNC). Any waveform type, including TTL or contact closure, is permissible. Minimum duration (pulse) is 20 μsec . Maximum gate rate is 20 kHz.

POWER 100 to 130 Vac or 200 to 260 Vac (switchable), 50-60 Hz, 10 Watts

CHASSIS DIMENSIONS 215 x 380 x 90 mm (8.5" wide x 15.5" deep x 3.5" high)

WEIGHT 4.5 kg (10 lb)

1201 PROGRAMMABLE VOLTAGE PREAMPLIFIER



Model 1201 Block Diagram

1201 REMOTE PROGRAMMING: Option 06

The Remote Programming Option (user-installable) permits the Model 1201 Low Noise Preamplifier to be interfaced directly to computers. Full gain control, with gain status and overload indication/recovery, is featured. Front panel high pass and low pass filter switch settings can be read out. Option 06, when installed in the Model 1201, also allows computer-controlled gated operation.

The programming format for Option 06 is BCD-coded. As outlined, there are twelve input lines, twelve output lines, two output select lines and two external pull-up lines.

FUNCTION		DESCRIPTION
INPUTS (12 lines)	1. GAIN CONTROL	3 lines for gain value mantissa command. 3 lines for gain value exponent command.
	2. GATING	1 line for gate control.
	3. OVERLOAD RECOVERY	1 line for instantaneous overload recovery, parallel operation with front panel overload recovery switch.
	4. LATCH	1 line to latch gain command.
	5. DEVICE SELECT	1 line inactivates all option outputs (excluding overload) and latches all option inputs. NOTE: Device select line serves as general purpose enable function and can be used to multiplex several Model 1201 Preamplifiers.
OUTPUTS (12 lines)	1. GAIN INDICATION	3 lines for gain value mantissa output. 3 lines for gain value exponent output. 1 line for exponent sign (polarity). 1 line for indication of uncalibrated gain when front panel gain vernier is not in CAL position.
	2. REMOTE	1 line to indicate remote operation of Model 1201 (front panel gain switch in "R" position)
	3. ERROR	1 line for indication of incorrect gain command.
	4. OVERLOAD	1 line for indication of overload condition, parallel with front panel overload indicator (for wired OR operation) 1 line for indication of overload condition, dependent upon device select line (for multiplexed operation).
OUTPUT SELECT (2 lines)	1. GAIN INDICATION	Gain readout when both lines are activated (high condition).
	2. HIGH PASS FILTER	High pass filter readout when 1 line is activated.
	3. LOW PASS FILTER	Low pass filter readout when 1 line is activated.
	4. IDENTITY	Model identification when both lines are inactivated (low condition)
EXTERNAL PULL-UP (2 lines)	1. OPTION INPUTS	1 line for external pull-up when internal jumper is transferred from +5 volt supply to external; permits external pull-up to +15V maximum.
	2. OPTION OUTPUTS	1 line for external pull-up when internal jumper is transferred from +5 volt supply to external; permits external pull-up to +15V maximum.

1201 REMOTE PROGRAMMING: Option 06

SPECIFICATION	LIMITS
1. GAIN CHANGE RATE	Gain change command rate (any span) to 10 commands per second.
2. OUTPUT SELECT SETTLING TIME	50 microseconds maximum
3. INPUT LEVELS	Low state: 0 – 0.7 V High state: +5 nominal (internal pull-up) High state: to +15 V maximum (when external pull-up line is activated).
4. INPUT IMPEDANCE	68 k nominal
5. INPUT CURRENT	CMOS Input (1/20 TTL load)
6. OUTPUT LEVELS	Low state: 0 – 0.7 V High state: +5 V nominal (internal pull-up) High state: to +15 V maximum (when external pull-up line is activated).
7. OUTPUT SINK CURRENT	3.2 mA minimum
8. INDICATION	Positive true, all inputs and outputs, except gate control, gate override, overload recovery and overload output.
9. CONNECTOR	Amphenol Micro Ribbon* type 57-30360, 36-pin

*Registered trademark of Amphenol

488A COUPLER

Model 488A Coupler allows the programming of the Model 1201 Preamplifier gain via the GPIB (IEEE – 488 bus). The 1201 must have Remote Programming Option 06 installed.

Interconnecting cables are available to control 1, 2, 3 or 4 1201 Preamplifiers from a single Model 488A

Coupler. The 488A has a pre-wired socket for an additional ROM which permits field update for controlling other DL Instruments such as 450 Series Amplifiers.

The Coupler can be mounted via a Rack Mounting Kit (requires 19" x 3.5" rack space).

For more information contact