MODEL 99539
PROGRAMMABLE CURRENT PREAMPLIFIER

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DESCRIPTION

The Model 99539 is a modular, multi–channel current preamplifier with parallel, logic level, gain control input. It consists of circuit boards which plug into a 3 1/2" high by 19" wide rack chassis. Each board comprises a single preamplifier channel. Each board includes a front panel with controls to manually override the remote gain control inputs. The front panel also contains indication light emitting diodes. The 19" rack chassis accommodates eight preamplifier channels. It also has a ninth slot for a user–provided microprocessor which provides gain control outputs, digitizes the preamplifier outputs and communicates via the VME bus to other system components. The 19" rack chassis incorporates a regulated dc supply which provides power to all nine modules and detector bias potentials.

PREAMPLIFIER MODULE

Gain

Programmable from 10^4 V/A to 10^{10} V/A in decade steps.

Bandwidth

–3 dB frequency shall be 300 Hz nominal 10^4 to 10^{10}

Gain A/V G	Input Spectral Density A rms/$\sqrt{Hz}$ at 1 kHz, max. L_f	Output Broadband dc – 1 kHz volts rms, typ. E_f Open Circuit
10^4	4×10^{-12}	1×10^{-6}
10^5	6×10^{-13}	1.5×10^{-6}
10^6	1.5×10^{-13}	4×10^{-6}
10^7	5×10^{-14}	12×10^{-6}
10^8	2×10^{-14}	50×10^{-6}
10^9	2×10^{-14}	500×10^{-6}
10^{10}	2×10^{-14}	5×10^{-3}

Input Offset Current

20 pA typ. @ 25°C. $10^8 – 10^{10}$ only —$(20)(10^{-12})(10^{10})$ = $20 \times 10^{-2} = 200$ mV 200 pA typ., $10^{-4} – 10^7$

Power Requirements

Analog Ground +15 V ±0.6 V @ 15 mA max.
–15 V ±0.6 V @ 15 mA max.
Digital Ground +5 V ±0.2 V @ 15 mA max.

Controls

Two miniature bat handled switches

a. REMOTE/LOCAL Mode Switch
Module operates under front panel control in LOCAL position and under microprocessor control in REMOTE position.

b. GAIN UP/DOWN Switch
Center off, spring loaded action. Sequences through the seven gain steps on each successive up or down actuation.

PREAMPLIFIER MODULE (Continued)

Control Coding	Bit 3 / Bit 2 / Bit 1 / Command 0 / 0 / 0 / 10^4 V/A 0 / 0 / 1 / 10^5 V/A 0 / 1 / 0 / 10^6 V/A 0 / 1 / 1 / 10^7 V/A 1 / 0 / 0 / 10^8 V/A 1 / 0 / 1 / 10^9 V/A 1 / 1 / 0 / 10^{10} V/A MSB / LSB
Gain Indicator	Eight light emitting diodes, one for each gain step.
Status Output	Single logic line to indicate LOCAL or REMOTE mode. This allows the microcontroller to know if a module is unavailable for control due to being set manually to LOCAL mode.
Logic Inputs and Outputs	5 Volt, positive = true = 1, TTL compatible logic Logic 0 < 0.8 V; Logic 1 > 2.0 V for inputs Logic 0 < 0.4 V; Logic 1 > 2.4 V for outputs Positive logic; true = 1 = high MOSFET Input Impedance Current drive (output)
Pin Assignments (rear connector of preamplifier board)	+15 V / 1 / 13 / +15 V Analog Ground / 2 / 14 / Analog Ground –15V / 3 / 15 / –15 V +5V / 4 / 16 / +5 V Digital Ground / 5 / 17 / Digital Ground uncommitted / 6 / 18 / uncommitted Signal In / 7 / 19 / Shield Ground Signal Out / 8 / 20 / Shield Ground Bit 1 / 9 / 21 / Digital Ground Bit 2 / 10 / 22 / Digital Ground Bit 3 / 11 / 23 / Digital Ground REMOTE/LOCAL / 12 / 24 / Digital Ground
Gain Switching Time	10 microseconds, max. except 10^7 – 10^8 transition, 1 msec. max.
Output Polarity	Positive conventional current into input (electron loss by detector) results in positive going voltage output.
Input Protection	Anti–parallel diodes across input.
Analog Output Impedance	50 ohms
Accuracy	±1%
Output Range	±10 Vdc
Input Overload Detection	None
Input/Output Signal	Single ended. BNC shells connected to analog ground on the corrsponding preamplifier P.C. Board

CHASSIS

Construction	19" side x 3 1/2" high x 16" deep, rack mountable with slides.
Rear Panel	Contains 117 Vac input module, 8 BNC analog inputs and 8 BNC analog outputs. All BNC connectors have their shields isolated from the chassis.
Order of Components	Viewed from the front: Power Supply leftmost Then, from left to right, preamplifier channels 1 through 8 in ascending order. Empty slot last (for microprocessor)
Power Distribution	±15 V, analog ground; ±5 V, digital ground bussed to analog channels 1 – 8. Separate wiring from power supply for these supply lines to the microprocessor board connector.
VME Bus Connection	User shall provide microprocessor board, A/D, etc. Provision is made for ±15 V, +5 V power, card guides and rear "D" connector.
Temperature Range Operating	0°C to 45°C, Specifications apply 25°C ±5°C
Slot Size for Modules	Panel width: 1.40 inches Board height : 2.20 inches overall 2.00 inches subtracting card guide depth Circuit area: 10.5 inches along length 2.0 x 10.50 = 21 square inches

For more information contact

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