

WIDE BAND CURRENT AMPLIFIER**1. Features**

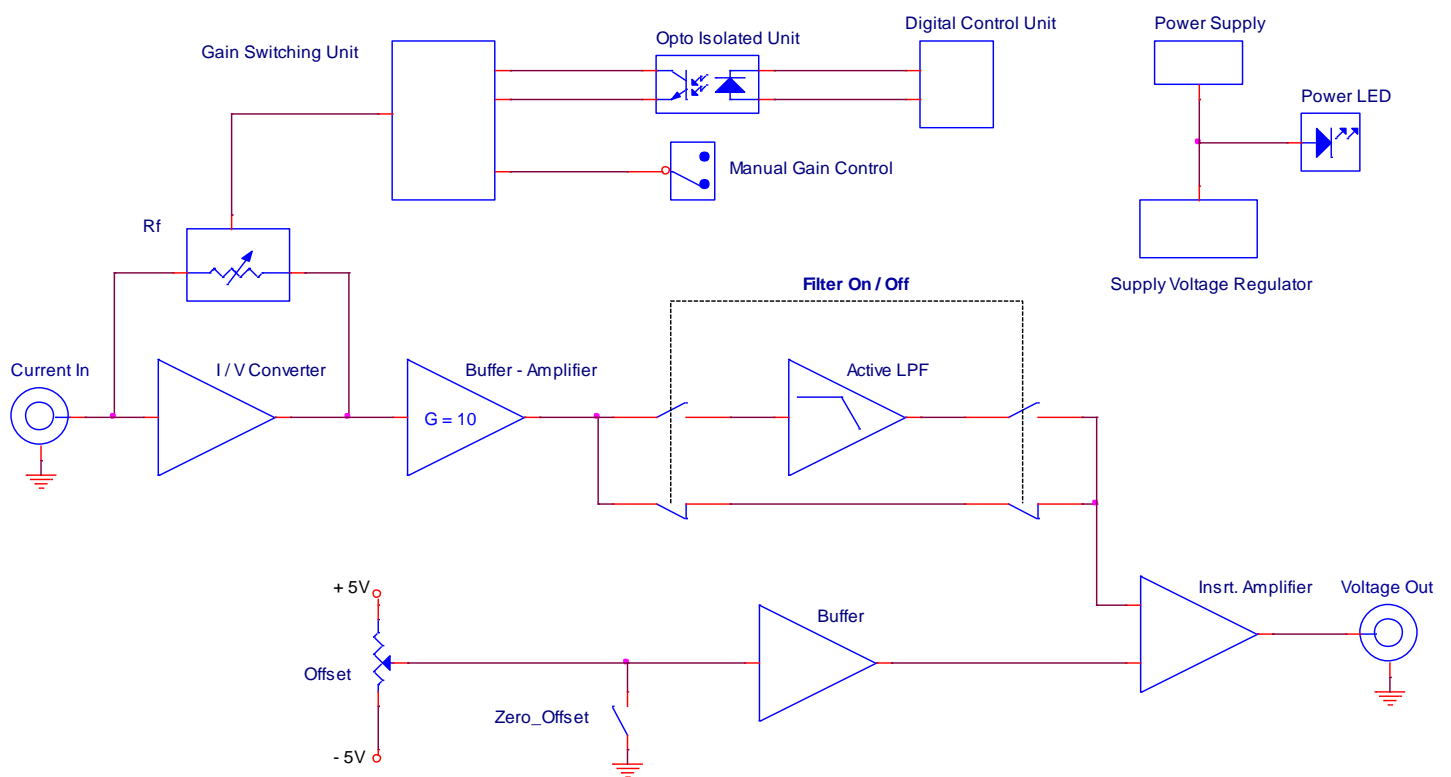
- Transimpedance Gain 10^6 to 10^9 V/A (switchable manually or from an external device)
- Bandwidth up to 1 MHz with the Gain = 10^9 V/A
- Adjustable output voltage offset
- Output Switchable (On/Off) 2-nd Order 20 kHz Low Pass Filter (LPF)

Note. LPF Passband Region can be changed according to customer requirement

2. Applications

- Scanning probe microscopy
- Charge particle detection
- High speed photodetector amplifier
- Photomultiplier amplifier
- Spectroscopy, etc.

3. Block Diagram



4. Specifications

- 4.1. Test Conditions : Power Supply = $\pm 5\text{VDC}$; $T_a = 25^\circ\text{C}$;
- 4.2. Gain (transimpedance) : 10^6 to 10^9V/A ; gain accuracy = $\pm 1\%$
- 4.3. Maximum input current: $30\mu\text{A pp}$;
- 4.4. DC input impedance: 50Ω ;
- 4.5. Output Voltage (@ $100 \text{k}\Omega$ load): 3V pp ;
- 4.6. Output offset voltage: $\pm 1\text{V}$ (adjustable with the "OFFSET" potentiometer)
The output offset voltage can also be set to zero using the toggle switch "ZERO";
- 4.7. Indicator LED: supply signaling (Power LED);
- 4.8. The output filter switching on / off is performed using the toggle switch "FILT_ON";

4.9. Measured dynamic parameters in the range up to 1 MHz at Gain = 10^9 V / A:

4.9.1. Without Filter

- Rise / Fall time (10% - 90%): ≤ 100 ns
- Nonlinear distortion: $\leq 0.1\%$
 - ❖ In the band 200 kHz:
- Input noise peak-to-peak current density : 324 fA pp / $\sqrt{\text{Hz}}$
- Input noise rms current density: 117 fA rms / $\sqrt{\text{Hz}}$

4.9.2. With 20 kHz Filter

- Rise / Fall time (10% - 90%): ≤ 100 ns
- Nonlinear distortion: $\leq 0.1\%$
 - ❖ In the band > 20 kHz up to 200 kHz:
- Input noise peak-to-peak current density: 160 fA pp / $\sqrt{\text{Hz}}$
- Input noise rms current density: 57 fA rms / $\sqrt{\text{Hz}}$

4.9.3. The minimum detectable input current (with a 20 kHz filter) is 10 pA pp.

4.10. Manual Gain Control is performed using the 5-position switch "GAIN" :

- 1-st position - Gain = 10^9 V/A
- 2-nd position - Gain = 10^8 V/A
- 3-rd position - Gain = 10^7 V/A
- 4-th position - Gain = 10^6 V/A
- 5-th position - Transition to Gain Control from an external device

4.11. Gain Control from the external device is performed by signals of level 0V (logical 0_LOW) / 5V (logical 1_HIGH) for three inputs (bits): Bit 1, Bit 2, Bit 3:

Gain (V/A)	Bit 1 (V)	Bit 2 (V)	Bit 3 (V)
10^9	0	0	0
10^8	5	0	0
10^7	0	5	0
10^6	0	0	5

4.12. Power Supply:

- Supply Voltage: $\pm 5\text{VDC}$
- Supply Current : +150 / - 100 mA (typ) (power supply capability ± 250 mA min. is recommended).

4.13. Temperature Range :

- Storage Temperature: -40°C ... +100°C
- Operating Temperature: 0°C... +60°C

4.14. Connectors:

- Input – BNC jack (female)
- Output - BNC jack (female)
- Power Supply - BINDER Plug, 711 Series, Panel Mount, 3 Contacts , type 09 0077 00 03:
 - Pin1 : +5V; Pin2 : GND; Pin3 : -5V
 - Mating Socket type : BINDER Socket: 99 0076 100 03
- External Gain Control – BINDER Socket, 711 Series, Panel Mount, 5 Contacts, type 09 0098 00 05:
 - Pin 1 : NC ; Pin2: Bit1; Pin3: Bit2; Pin4: Bit3; Pin5: Common (GND)
 - Mating Plug type: BINDER Plug :99 0095 100 05

4.15. Dimensions : 100 mm x 75 mm x 35 mm (L x W x H)

4.16. Accessory:



Linear Power Supply

- Input Voltage -- 220VAC, 50/60Hz (or 110VAC, 50/60Hz by order)
- Output Voltage -- ± 5VDC
- Ripple Voltage – < 2.0 mVpp
- Output Current -- ± 350 mA