



ML200

MICROPHONE AMPLIFIER

OPERATING AND MAINTENANCE MANUAL



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GENERAL

The NANOAMP™ Series ML200 dual channel microphone preamplifier is an inexpensive, high performance, dual low noise amplifier designed to cleanly boost professional microphones to balanced line level. The ML200 is ideal to drive long lines in the presence of high hum and noise or as an auxiliary rack mounted preamplifier to convert mixer high level inputs to microphone levels.

The ML200 provides two outputs at either line or microphone level to drive balanced and unbalanced lines. HI and LO preamp gain levels are front panel selectable for each channel. Peak indicators monitor preamp and output circuit levels. Switched phantom microphone power is provided and all audio connections are made using XLR type connectors.

The ML200 accepts microphone inputs from -76dBm to $+18\text{ dBm}$ through a high impedance (20Kohms) balanced, low noise, transformerless (no ringing) instrumentation amplifier input (A1, A2) and drives servo balanced 600 ohm (minimum load) outputs (A4, A5) to $+4\text{ dBm}$ balanced line level ($+22\text{ dBm}$ maximum). The servo-balanced outputs automatically detect single-ended (one side grounded) loads. They remove drive from the grounded output and double the signal applied to the ungrounded output thus maintaining equal gain for both types of loading.

An internal input gain setting DIP switch used in conjunction with the front panel HI – LO gain selector optimizes the preamplifier stage gain, noise and headroom for the microphone outputs rated at -60 , -50 , or -40 dBm (HI) or -40 , -30 , or -10 dBm (LO). 30 dB of input headroom is provided in the HI position allowing 10, 20, or 30 dBm additional range, if necessary. The Master Gain controls (R23, R24) adjust the output line level. Individual internal jumper plug output attenuators (P1, P2) provide -50 dBm microphone level outputs, if desired.

PEAK indicators for each channel monitor both the preamp stage output level (before the MASTER level controls) and the output drive voltage. The PEAK indicators operate at 4 to 5 dB below clipping and track varying supply voltages. If turning down the output level with the MASTER does not turn off the PEAK indicator, then a reduction of input stage gain with the HI – LO switch is indicated.

Phantom microphone power at regulated $+20.2\text{ VDC}$ from A6 is selected with a front panel switch and is sufficient for most powered microphones. $+48\text{ VDC}$ phantom power is also available as an inexpensive plug-in option (PH48-1); consult factory.

NANOAMP units require 22 to 32 VDC and are designed to share a common external 24 VDC “Wall Wart” type power supply. A pair of loop-thru DC connectors on the rear of each ML200 permits several units to be daisy-chained with P/N 20602-1 DC power cables to a single power supply. The WA100-1 (120VAC) and the WA100-2 (230 VAC) are 400 mA supplies. The ML200 draws about 100 mA at full output. Any combination of NANOAMP units, which add up to less than the supply rating, can be powered by a single supply.

INSTALLATION AND WIRING

AUDIO CONNECTORS

Balanced XLR type inputs and outputs are wired with pin 2 as HI and pin 3 as LOW. Pin 1 is the cable shield and ground connection.

Active balanced inputs and outputs require a reference ground connection to the source or receiving device for proper operation. This ground can be provided by the rack frame or a studio ground bus connection if the cable shield does not carry it through.

GROUNDING

Operation in high RF broadcast environments requires special attention to grounding and shielding. The chassis *must* be grounded directly to a good, low impedance studio ground system. Input and output connections must be properly shielded and free of ground loops. In extreme cases, it may even be necessary to add shielding to the DC input leads to avoid RF pickup.

POWER DISTRIBUTION

Multiple NANOAMP units sharing a single wall-wart power supply should be looped through each other using the DC interconnect cables P/N20602-1. Hum and noise performance of the units can be degraded by poor DC ground connections between units sharing a common supply. Use of the recommended rack and desk mounting kits will assure a good ground connection between units by firmly strapping their chassis together.

CAUTION!

The outer shell of the DC interconnect cables is positive relative to the chassis. Do not allow a DC cable plugged into a powered unit to hang loose where it can short against chassis or rack frame.

SETUP

Before mounting your NANOAMP in a rack, remove the top cover (4 upper side screws) and set the preamp gain DIP switches (S5, 6, c and d) to match the nominal expected input level for the HI gain position of the panel switches. Set the LO preamp gain with the DIP rocker switches (S5, 6, a and d) to the highest level that does not permit input circuit PEAK indications. Higher output mics will require lower gain settings (20 – 30 dB) while low output mics will require higher gain settings (40 – 60 dB). Also, select line (+4 dBm) or mic level (-50 dBm) outputs with jumper plugs P1 or P2.

MOUNTING

NANOAMP units may be rack mounted one, two, or three across in a standard EIA 19" rack and will require only 1-3/4" of vertical space. Rack mount kit P/N 21075-501 mounts one, two or three units. 1/3 RU Filler Panels are available as P/N 21097-501.

Single desk mounting kits consist of a pair of angled base plates that mount under the lower front and rear cover screws of a single unit, to raise and to tilt it for easy use. In addition, one or more sets of vertical stacking plates, mounting to the upper front and rear cover screws of the bottom unit, allow multiple units to be stacked. Several units can be desk mounted side-by-side and even stacked side-by-side using horizontal joiner kits together with mounting base and stacker kits. P/N 20617-501 is the angled base kit. P/N 20617-502 is the base plus one stacker kit (two high). P/N 20617-503 is the base plus two stackers (three high). P/N 20617-505 is a horizontal joiner kit.

OPTIONS

230 VAC OPERATION

The WA100-2 tabletop power supply accepts 230 VAC/50-60 Hz via an IEC320 male 3 pin AC input connector. User supplies a matching line cord for the local power system.

BATTERY OPERATION

Alkaline battery packs (BBU100-1), 24 VDC gel cell rechargeable battery packs (PPA-1) and a DC converter (DCA100-1) to operate from 12 V belt pack, NP-1 or auto batteries are available as accessories.

48 VDC Phantom Power

An internal DC converter (PH48-1) can boost the phantom power up to 48 VDC. Specify when ordering.

MAINTENANCE

There is no routine required by your NANOAMP. If you have a problem, check the panel LED indicators to assure that the unit has DC power, eliminate by substitution input and output cables, connectors, downstream device, DC interconnect cables and Wall Wart power supplies.

POWER SUPPLY LEVELS

The recommended loaded DC input voltage range is 22 VDC minimum to 32 VDC maximum over the full range of AC line voltage tolerances. The audio circuits will continue to work with reduced headroom below 22 VDC but the phantom microphone power will drop out of regulation. Momentary surges up to 36 VDC will cause some increased internal heating.

OPERATING POINTS

An Internal reference voltage equal to 1/2 the supply voltage is generated. All audio stage IC inputs and outputs should show a DC level equal to this voltage when measured with a high impedance meter. Audio inputs and outputs are capacitor coupled and ground referenced.

TECHNICAL SPECIFICATIONS

CONNECTORS	XLR, locking
GAIN	HI: 80, 70 & 60 dB; LO: 60, 50 & 30 dB
NOMINAL POWER	-50 dBu in, +4 dBm out at 40 dB preamp gain
PEAK LEVELS	-20 dBu in, +22 dBm out to 600 ohm balanced loads; 40 dB preamp gain
HARMONIC DISTORTION	.02% max. at Peak Levels, .01% max. at Nominal Levels, 20 Hz to 20 kHz
FREQUENCY REPOSE	-.25 dB, 20 to 20,000 Hz
CROSSTALK	70 dB minimum at 10 kHz
INPUT IMPEDANCE	Balanced, 20 kohms bridging
OUTPUT IMPEDANCE	Balanced, 40 ohms maximum
PHANTOM POWER	20.2 VDC regulated; PH48-1 48 VDC phantom power accessory available
DIMENSIONS in. (cm)	1.75" (4.45) H by 5.6" (14.2) W by 5.75" (14.6) D
NET WEIGHT	1.25 lb (.57 Kg)
POWER	24 VDC @ .1A nominal, 22 Vmin. to 30 Vmax, loop thru cylindrical connectors, 2.0 mmID, sleeve is positive. External Power Supply WA100-1 (120VAC) supplied as standard WA100-2 (230VAC) Power Supply optional

ACCESSORIES

WA100-1	Wall mount power supply (UL), 24 VDC @ .4 amp, 115 VAC/60 Hz (standard)
WA100-2	Table top power supply, 24 VDC @ .4 amp, 230 VAC/50-60 Hz with IEC 320 male 3 pin AC input indicator; user supplies matching AC line cord for local power system (optional)
BBU100-1	Battery Pack unit houses four 9V alkaline batteries (not included); 6 to 8 hour life
PPA-1 (-2)	Rechargeable 24 VDC gel-cell battery pack with charger for 120 VAC (230 VAC)
DCA100-1	DC-to-DC converter powers several units from 12 VDC mobile and belt pack batteries; supplies 24 VDC @ .2 amp
20602-1	DC power cable assembly for looping the DC power between NANOAMP units

RACK MOUNT KITS

21075-501 21097-501	19-inch 1RU Rack Mount Shelf Assembly 1/3 RU Filler Panel for 21075-501
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DESK MOUNT KITS

20617-501	Angled desk mount base
20617-502	Angled desk mount base and one stacker (2 units high)
20617-503	Angled desk mount base and two stackers (3 units high)
20617-504	Stacker without angled base (2 units high)
20617-505	Horizontal joiner (2 units side-by-side)

FIELD ACCESSORIES

PROK-1	Side protection plates with side mounts for quick-change battery packs
ABAG-1	Carry case with strap for unit plus power packs (includes PROK-1)