

# BENCHMARK MEDIA SYSTEMS, INC.

## RGC-04 Installation Instructions

### Signal Routing

All System 1000 daughterboards take over the signal routing function from the signal routing switch or jumpers on the target motherboard. Thus, for proper operation, these switch positions generally must be opened or the jumpers removed.

### Motherboard Signal Routing Switches

On the DA-101, all signal routing switch positions, except position 3, which makes the power amplifier a balanced output amplifier, must be in the off position. On the DA-102, *all* signal routing switch positions must be off. The two position signal routing switch on the MDA-101PA should have position 1 open and, for normal DA operation where a balanced output is desired, position 2 must be closed. In the case of the MDA-102, two shorting jumpers, W1601 and W3601, must be removed from their posts.

### Installation on a Motherboard

All Benchmark System 1000 daughterboards and motherboards use two rows of interface pins. In the top row there are 10 pins at the physical top of the motherboard and a corresponding 10 position female strip at the bottom of the daughterboard. In the lower section of each board are 8-pin strips. Please exercise care in the installation of the daughterboard onto its intended motherboard. It is quite possible to misalign the pins or to invert the daughterboard from its normal position. Make sure that the insulating Lexan® piece is also between the motherboard and daughterboard.

!!! Warning !!!

Care must be exercised when installing a daughterboard. Catastrophic failure may be the result of pin misalignment or inverted installation.
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### Power Requirements

The power requirements for the RGC-04 are a split (dual) power supply with output voltages of  $\pm 15$  volts. This supply is provided through the daughterboard mounting pins. Current requirements are approximately  $\pm 50$  mA.

### Daughterboard Signal Routing Switch

S1201, the signal routing switch on the RGC-04, routes the VCA controlled signals to the various outputs and allow for the mixing of these signals. When used with either line level or microphone preamplifier stereo DAs, switch position 1 routes the left input to the left output, and is normally on. Switch position 2 routes the right input signal to the left output and is normally off. Switch position 3 routes the left input signal to the right output amplifier and is normally off. Switch position 4 routes the right input signal to the right output amplifier and is normally on.

Other System 1000 modules have specific functions possible with the RGC-04 daughterboard which are intuitively seen by studying the schematics of the motherboard and the RGC-04

### Control Voltage Input Connections

Input connections to the backplane card edge connector are made either using the SIB-70 Signal Interface Board, or with Molex® SL™ connectors. Three options exist for the interconnection of control voltage to the RGC-04, depending upon the control voltage polarity that is available. The connections may be made differentially, using two pin housings and pins where the connector is oriented vertically.

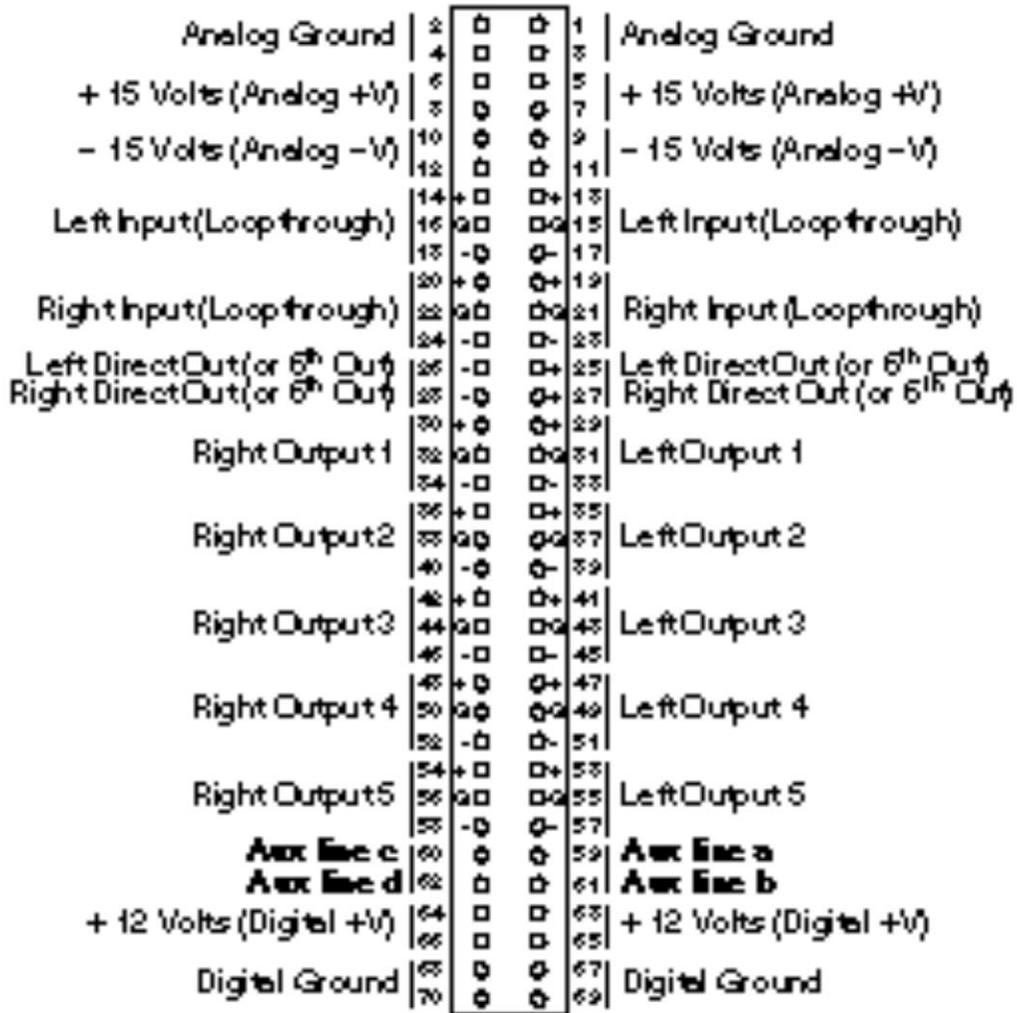


Figure 1. DA-102 Card Edge Connector (Rear View) Showing Aux.0 Line Inputs

### RGC-04 Performance

The RGC-04 has an overall amplification range of  $\approx -85$  to  $+5.5$  dB. The unit has state of the art performance of 0.002% or less THD across the audio band at maximum output level. The device operates as a voltage controlled attenuator, although a small amount of gain ( $\approx 5$  dB) is possible. Control voltages from -10 (max attenuation) to +3 volts (max gain) are normally required to fully control the device. Zero volts input yields unity gain.

The board, as shipped, is set up for stereo operation; that is, switch positions one and four are on, and two and three are off. Mono mix operation is easily achieved by closing switch positions 2 and 3, as well as the normally closed switch positions 1 and 4. Channel swapping is done by turning off positions 1 and 4 and turning on positions 2 and 3.

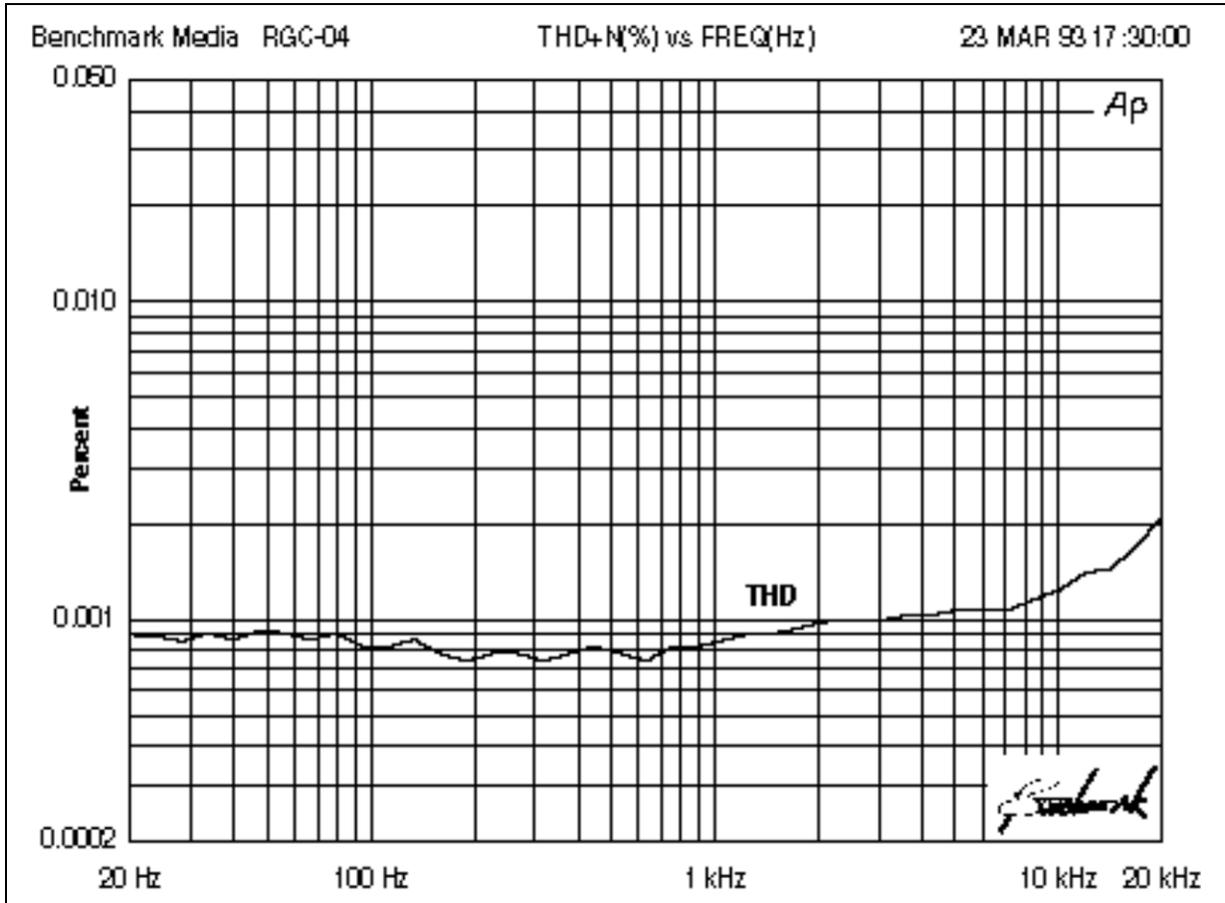


Figure 2. RGC-04 Total Harmonic Distortion at + 20 dBu Out

### Control Voltage Input Connections

Normal control voltage (positive control law of 10 dB/volt to unity gain) from standard Benchmark controllers is fed to AUX lines **a** (left channel) and **c** (right channel). These input points are found at card edge connector pins 59 and 60 respectively. AUX lines **b** and **d**, card edge pins 61 and 62 respectively, must be grounded. Failing to ground these pins reduces the gain of the input amplifier by a factor of 2 and thus increases the required input control voltage range to -20 to +6 volts. See the RGC-04 schematic.

Negative control law operation is easily achieved by feeding the control voltage into aux lines **b** and **d** and grounding aux lines **a** and **c**. In this case + 10 volts would yield maximum attenuation and - 3 volts will yield maximum gain. The scaling ratio of 10 dB per volt remains the same, but control voltage requirement is now inverted.

Since the control voltage input amplifier is a differential amplifier, both lines may be taken to either a differential output control voltage driver, or used in a forward referencing scheme

when driven from an unbalanced driver. See the Benchmark Media Systems application note "A Clean Audio Installation Guide" by Allen Burdick for more information on the latter.

### **Other Control Voltage Ranges**

Additional control voltage ranges may be handled by the RGC-04 and can be custom configured at the factory. Please contact the sales department for further information and assistance.

### **Installation on Older Distribution Amplifiers**

On some older System 1000 DAs it may be necessary to remove W1201 and W2201 from the RGC-04, and to install resistors R1207 and R2212. If, after installing the daughterboard on the target motherboard, extreme clipping occurs with the audio signal, it is probable that these resistors will need to be installed. Contact the factory for assistance in choosing the correct value of resistors for R1207 and R2212.

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