# 8-pin Lead-Less-Package (LLP) Dual Op Amp Evaluation Board

Part Number CLC 730114

June 2001

The CLC730114 evaluation board is designed to aid in the characterization of National's 8-pin Dual Op Amps in LLP package. This board uses all surface-mount components for maximum speed and performance. Figure 1 shows the schematic:

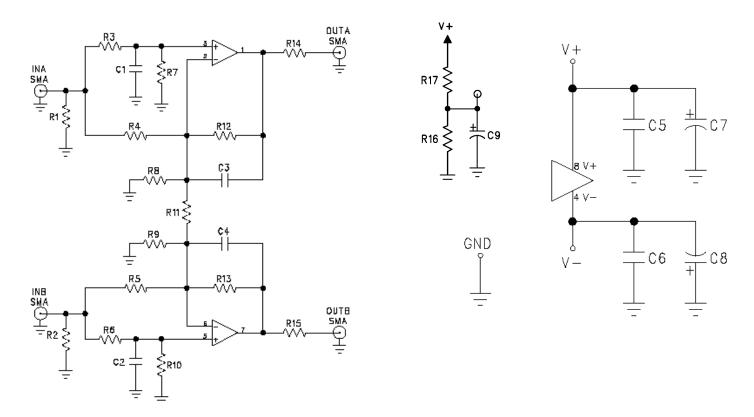


Figure 1: Complete Evaluation Board Schematic

This board is designed with versatility in mind; that is, by selective insertion of components, the device can be put into an Inverting, non-inverting, or differential configuration. In addition, single supply operation can be tested with simple board modifications (please see below).

C5-8 (4 places) are de-coupling caps essential to be installed for good high frequency behavior.  $0.1\mu F$  and  $6.8\mu F$  are good values in most cases. Note that C7-8 are polar caps. Use Tantalum capacitors for lowest ESR.

The CLC730114 evaluation board uses a thermally dissipation pad soldered to the exposed die attach paddle (DAP) of the device under test (DUT) to enable heat transfer out of the package.

## **SINGLE SUPPLY OPERATION:**

In order to allow maximum flexibility, it is possible to test the Op Amp in a single supply arrangement as well. To do so, R16, R17, and C9 can be installed to form a "virtual ground" which would be tied to the non-inverting terminal as biasing. A convenient way to connect C9 (positive side) to the inputs is by performing the following:

- 1. Cut R7 and R10 connection to ground plane, on component side.
- 2. Install  $0\Omega$  resistances for R7 and R10
- 3. Tie C9 (positive side) to the cut side of R7 and R10.

#### **DAP Connection:**

# IMPORTANT: BOARD MODIFICATIONS BELOW MUST BE MADE PRIOR TO APPLYING POWER TO THE BOARD

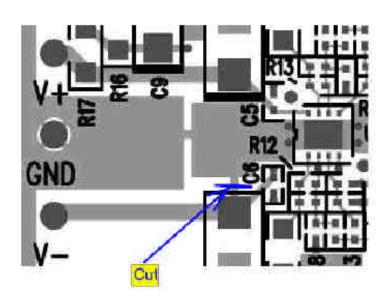
CLC730114 evaluation board can be used with two types of Op Amps:

- 1. Op Amp's with DAP internally floating. (see modification for "type 1" below)
- 2. Op Amp's with DAP internally tied to V (see modification for "type 2" below)

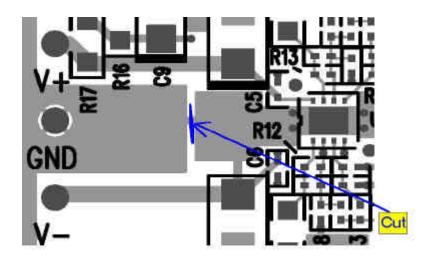
CLC730114 DAP heatsink connection is tied to both ground and V<sup>-</sup>. It is very important to make the necessary modifications outlined below BEFORE powering up the board. **Otherwise, there will be excess current flow from V**<sup>-</sup> **due to a direct short to ground through the copper under device used for heatsink**. Consult the data sheet for each device for information on DAP connection and which of the modifications below is required for the particular device.

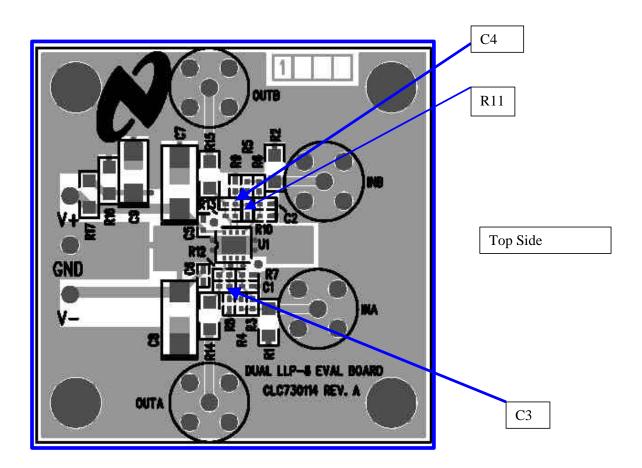
#### BOARD MODIFICATION FOR PROPER BIASING ON DAP:

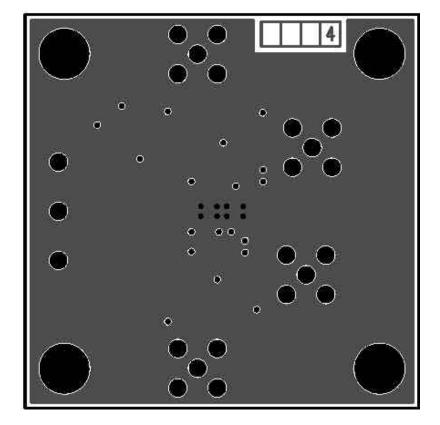




"TYPE 2" MODIFICATION







Bottom Side

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