User's Guide
SBOU003B–May 1998–Revised May 2010

DEM-OPA-SO-2A Demonstration Fixture

1 Description

The DEM-OPA-SO-2A demonstration fixture is a generic, unpopulated printed circuit board (PCB) for dual high-speed operational amplifiers in SO-8 packages. Figure 1 shows the package pinout for this PCB. For more information on these op amps, as well as good PCB layout techniques, see the individual amplifier data sheets.

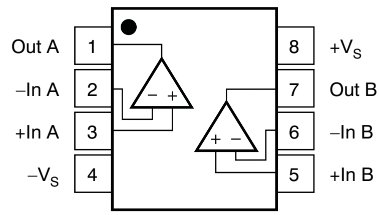

Figure 1. SO Package Pinout, Top View

2 Circuit

The circuit schematic in Figure 2 shows the connections for all possible components. Each configuration uses only some of the components.

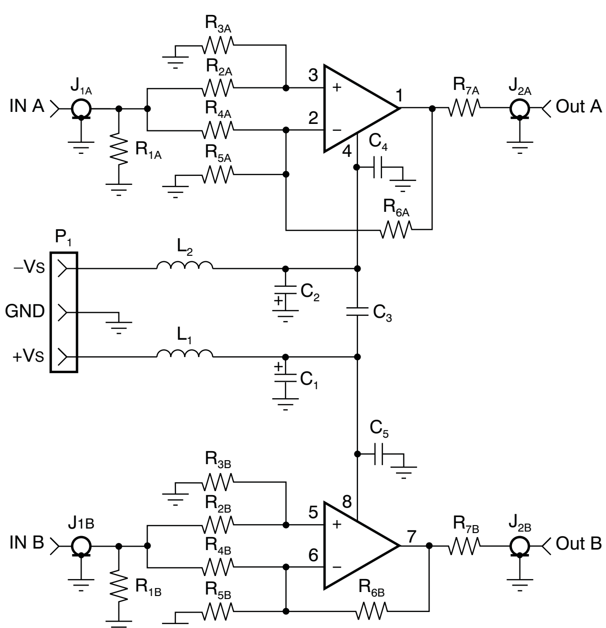

Figure 2. Schematic for DEM-OPA-SO-2A

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3 Components

Components that have RF performance similar to the ones listed in Table 1 may be substituted.

Table 1. Component Descriptions

PART	DESCRIPTION
C_1, C_2	Tantalum Chip Capacitor, SMD EIA Size 3528, 20V
C_3 – C_5	Multilayer Ceramic Chip Capacitor, SMD 1206, 50V
J_{1A} – J_{2B}	SMA or SMB Board Jack (Amphenol 901-144-8)
L_1, L_2	EMI-Suppression Ferrite Chip, SMD 1206 (Steward LI 1206 B 900 R)
P_1	Terminal Block, 3.5mm Centers (On-Shore Technology ED555/3DS)
R_{1A} – R_{7B}	Metal Film Chip Resistor, SMD 1206, 1/8W

R_1 and R_7 set the I/O impedance; R_2 through R_6 set the gain; and C_1 through C_5 are supply bypass capacitors. C_3 is optional; it adds a bypass between the supplies that improves distortion performance for some models. L_1 and L_2 are ferrite chips that can reduce interactions with the power supply at high frequencies. If not desired, they can be replaced with 0Ω resistors.

For single-supply operation, do not connect L_2; otherwise, the $-V_S$ input to P_1 would be at ground potential.

Standard Current-Feedback Op Amps—These op amps have the pinout illustrated in Figure 1. Table 2 lists typical values used for these parts. To select component values (especially R_6) for a specific op amp , consult the respective data sheet.

Table 2. Standard Current-Feedback Op Amps[(1)]

COMPONENT	DUAL-SUPPLY (G = +2)	DUAL-SUPPLY (G = –1)	SINGLE-SUPPLY (G = +1)
R_1	49.9Ω	57.6Ω	49.9Ω
R_2	10.0Ω	Open	10.0Ω
R_3	Open	10.0Ω	Open
R_4	Open	402Ω	Open
R_5	402Ω	Open	Open
R_6	402Ω	402Ω	402Ω
R_7	49.9Ω	49.9Ω	49.9Ω
C_1, C_2	2.2μF	2.2μF	2.2μF
C_3	0.01μF	0.01μF	Open
C_4, C_5	0.1μF	0.1μF	0.1μF

(1) The values and gains listed here will not work for all op amps. See the specific data sheet to select proper values. The I/O impedances are 50Ω.

Standard Voltage-Feedback Op Amps—These op amps have the pinout shown in Figure 1. Table 3 lists typical values used for these parts. To select component values for a specific op amp (especially R_6), consult the respective data sheet.

Table 3. Standard Voltage-Feedback Op Amps[(1)]

COMPONENT	DUAL-SUPPLY (G = +2)	DUAL-SUPPLY (G = –1)	SINGLE-SUPPLY (G = +1)
R_1	49.9Ω	57.6Ω	49.9Ω
R_2	178Ω	Open	0Ω
R_3	Open	210Ω	Open
R_4	Open	402Ω	Open
R_5	402Ω	Open	Open
R_6	402Ω	402Ω	24.9Ω
R_7	49.9Ω	49.9Ω	49.9Ω
C_1, C_2	2.2μF	2.2μF	2.2μF
C_3	0.01μF	0.01μF	Open
C_4, C_5	0.1μF	0.1μF	0.1μF

(1) The values and gains listed here will not work for all op amps. See the specific data sheet to select proper values. The I/O impedances are 50Ω.

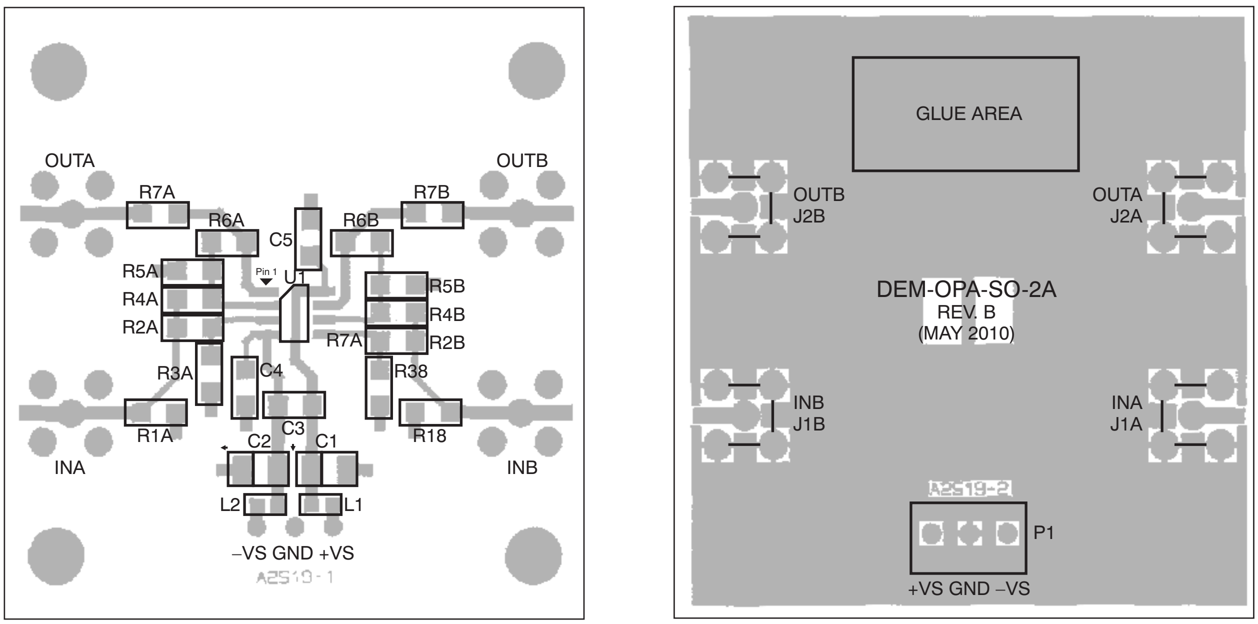
Fixed Gain Amplifiers—For fixed gain amplifiers use internal resistors to set the gain at +1, +2 or –1. Use the recommended values given in Table 2, except for the changes listed in Table 4.

Table 4. Fixed Gain Amplifiers Changes

COMPONENT	DUAL-SUPPLY (G = +2)	DUAL-SUPPLY (G = –1)	SINGLE-SUPPLY (G = +1)
R_4	Open	0Ω	Open
R_5	0Ω	Open	Open
R_6	Open	Open	Open

4 Board Layout

This demonstration fixture is a two-layer PCB. (See Figure 3.) It uses both a ground plane and power traces on the inner layers. The ground plane has been opened up around op amp pins that are sensitive to capacitive loading. Power-supply traces are laid out to keep current loop areas to a minimum. The SMA (or SMB) connectors may be mounted either vertically or horizontally onto the board edge. The location and type of capacitors used for power-supply bypassing are crucial for high-frequency amplifiers. The tantalum capacitors, C_1 and C_2, do not need to be close to pins 8 and 4 on the PCB and may be shared with other amplifiers. See the individual op amp data sheet for more information on proper board layout techniques and component selection.



(a) Component Side Silkscreen and Metal

(b) Ground Plane Side Silkscreen and Metal (bottom view)

(1) The board name shown in the silkscreen for an earlier version of the fixture is DEM-OPA268xU with the Burr-Brown Revision A design finalized in May 1998.

Figure 3. DEM-OPA-SO-2A Demonstration Board Layout

5 Measurement Tips

This demonstration fixture, with the component values shown, is designed to operate in a 50Ω environment; most data sheet plots are obtained under these conditions. It is easy to change the component values for different input and output impedance levels. However, do not use high-impedance probes; they represent a heavy capacitive load to the op amp, and will alter the amplifier response. Instead, use low-impedance (≤ 500Ω) probes with adequate bandwidth. The probe input capacitance and resistance set an upper limit on the measurement bandwidth. If a high-impedance probe must be used, place a 100Ω resistor on the probe tip to isolate its capacitance from the circuit.

REVISION HISTORY

Changes from A Revision (April, 2006) to B Revision	Page
• Changed silkscreen image in Figure 3	4

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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It is important to operate this EVM within the input voltage range of ±15V and the output voltage range of –15V to +15V.

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

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During normal operation, some circuit components may have case temperatures greater than +50°C. The EVM is designed to operate properly with certain components above +50°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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