DEM-OPA-SO-3A Demonstration Fixture

1 Description

The DEM-OPA-SO-3A demonstration fixture is a generic, unpopulated printed circuit board (PCB) for high-speed triple operational amplifiers in SO-16 packages with flow-through pinout. Figure 1 shows the package pinouts supported by this PCB. For more information on any individual op amps, as well as good PCB layout techniques, see the individual amplifier data sheets.

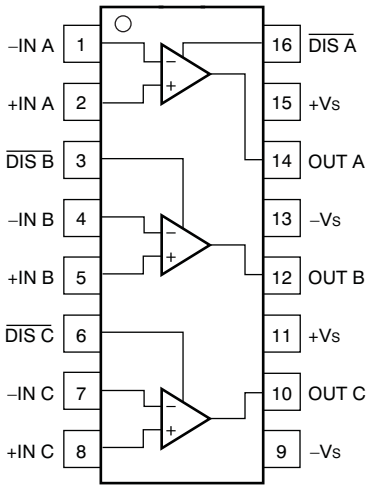


Figure 1. SO-16 Package Pinout, Top View

2 Circuit

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

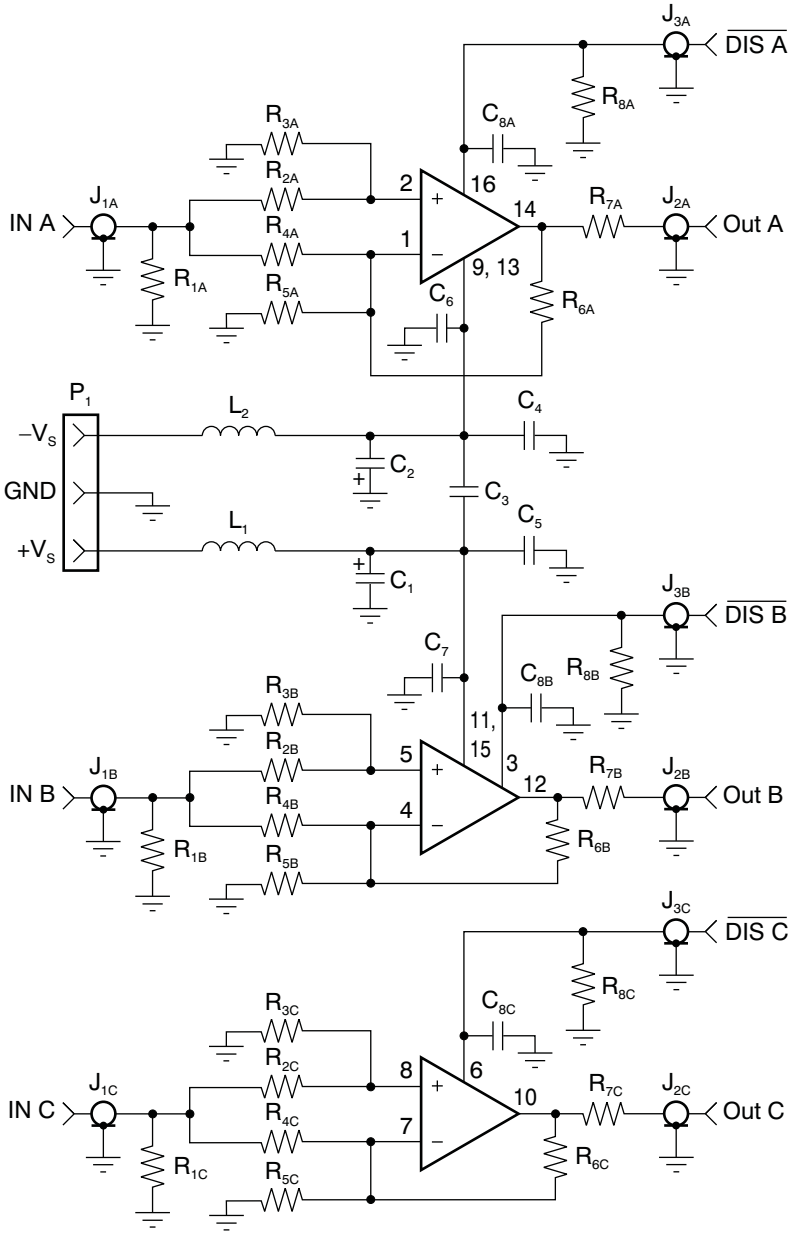


Figure 2. Schematic for DEM-OPA-SO-3A

3 Components

Components that have RF performance similar to the ones listed in Table 1 may be substituted. C_1 and C_2 need a larger voltage rating for ±15V dual supplies.

Table 1. Component Descriptions

PART	DESCRIPTION
C_1, C_2	Tantalum Chip Capacitor, SMD EIA Size 3528, 20V
C_3 – C_{8C}	Multilayer Ceramic Chip Capacitor, SMD 1206, 50V
J_{1A} – J_{3C}	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_{8C}	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, R_8 and C_8 configure the disable pin, and C_1 through C_7 are supply bypass capacitors. C_3 is optional; it adds a bypass between the supplies that improves distortion performance for some devices. 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.

4 Board Layout

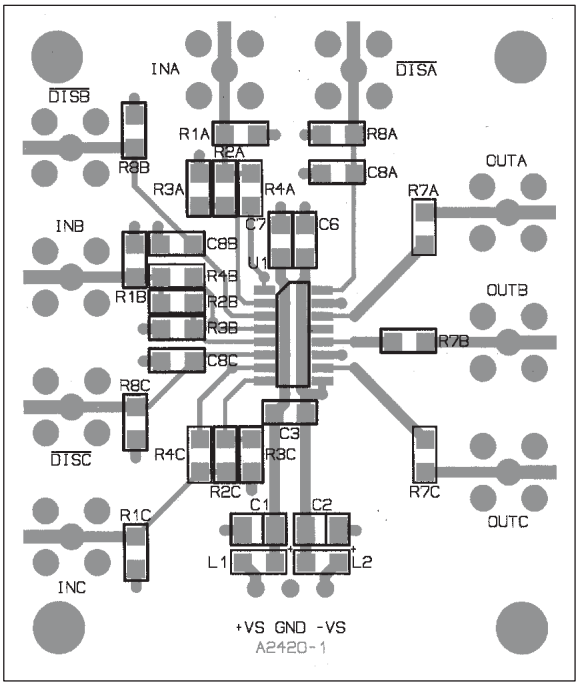
This demonstration fixture is a two-layer PCB. (See Figure 3.) It uses a ground plane on the bottom, and signal and power traces on the top. The ground plane has been opened up around op amp pins sensitive to capacitive loading. Power-supply traces are laid out to keep current loop areas to a minimum. The SMA (or SMB) connectors may be mounted either vertically or horizontally.

The location and type of capacitors used for power-supply bypassing are crucial to high-frequency amplifiers. The tantalum capacitors, C_1 and C_2, do not need to be as close to pins 7 and 4 on the PCB, and may be shared with other amplifiers.

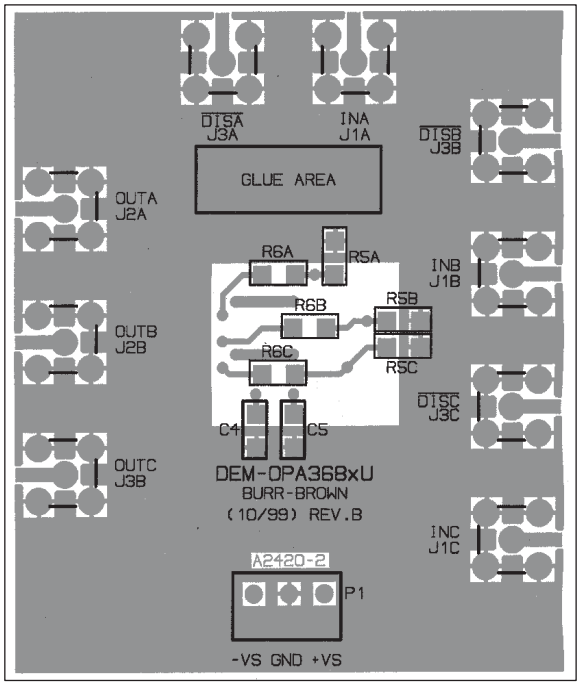
See the individual op amp data sheet for more information on proper board layout techniques and component selection.

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.



(a) Component Side Silkscreen and Metal



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

(1) The board name shown in the silkscreen is DEM-OPA368xU with the Burr-Brown Revision B design finalized in October 1999.

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

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