LTC6363-1, LTC6363-2, LTC6363-0.5
Fully Differential Amplifier

DESCRIPTION

The LTC®6363-1, LTC6363-2, LTC6363-0.5 are low power, low noise differential op amps with built-in precision resistors to establish accurate gains of 1, 2 or 0.5 respectively.

The DC2655A is a small-size demo circuit that minimizes trace resistance in series with the IC, so that the precise gain and CMRR can be maintained. The board's inputs can be driven single-ended or differentially. The signal path from inputs to outputs is DC-coupled. An onboard jumper configures the DC2655A for dual or single power supply. To minimize PCB layout parasitics, the configurability of this board has been minimized. For a more flexible board refer to the DC2319A.

Design files for this circuit board are available at http://www.analog.com/DC2655A

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Table 1. DC2655A Versions

PART NUMBER	DEMO CIRCUIT NUMBER	DESCRIPTION
LTC6363-1	DC2655A-A	Internal Gain Resistors G = 1
LTC6363-2	DC2655A-B	Internal Gain Resistors G = 2
LTC6363-05	DC2655A-C	Internal Gain Resistors G = 0.5

QUICK START PROCEDURE

Refer to Figure 1a. Check to ensure that jumper JP1 is set as shown (single supply). Power-up the DC2655A from a single power supply, V^+ = 5V and GND = 0V. Connect V_{IN}^- to ground using E8. Connect an input voltage to V_{IN}^+ using E7. The differential output voltage can then be measured on V_{OUT}^- and V_{OUT}^+ (E9 and E10). The outputs will be level-shifted to be balanced symmetrical around approximately 2.5V. The difference between the outputs will be the gain times the difference between the inputs.

For a similar setup using a split supply, change the setting of JP1 to dual supply, and connect a negative supply to V^-. See Figure 1b.

QUICK START PROCEDURE

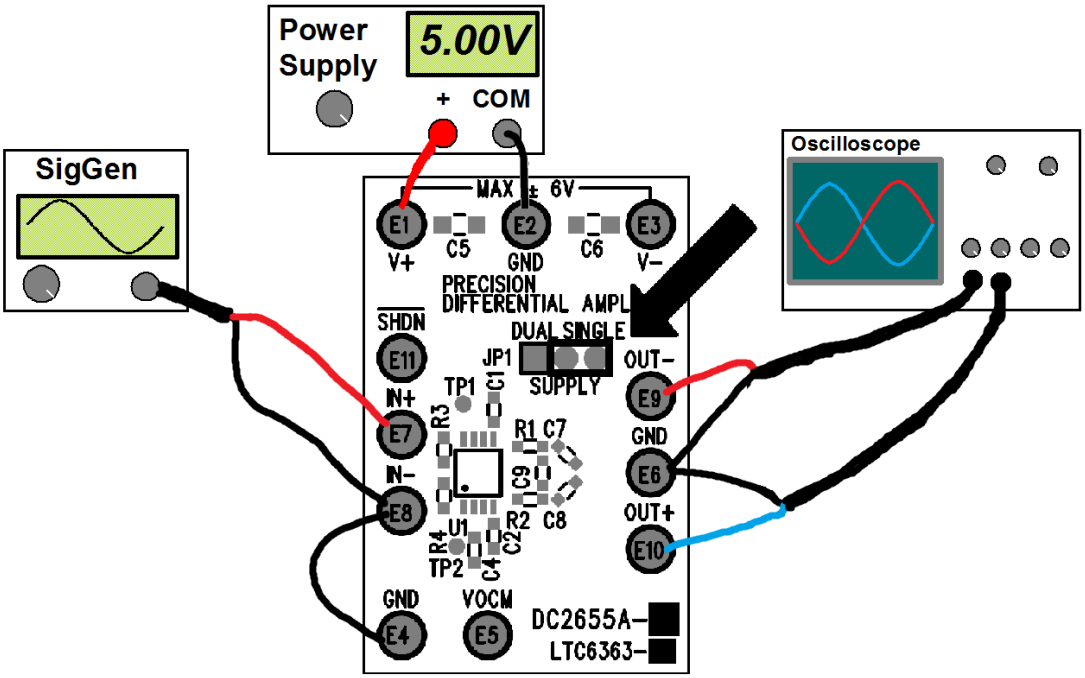

Figure 1a: DC2655A Connection Diagram (Single Supply)

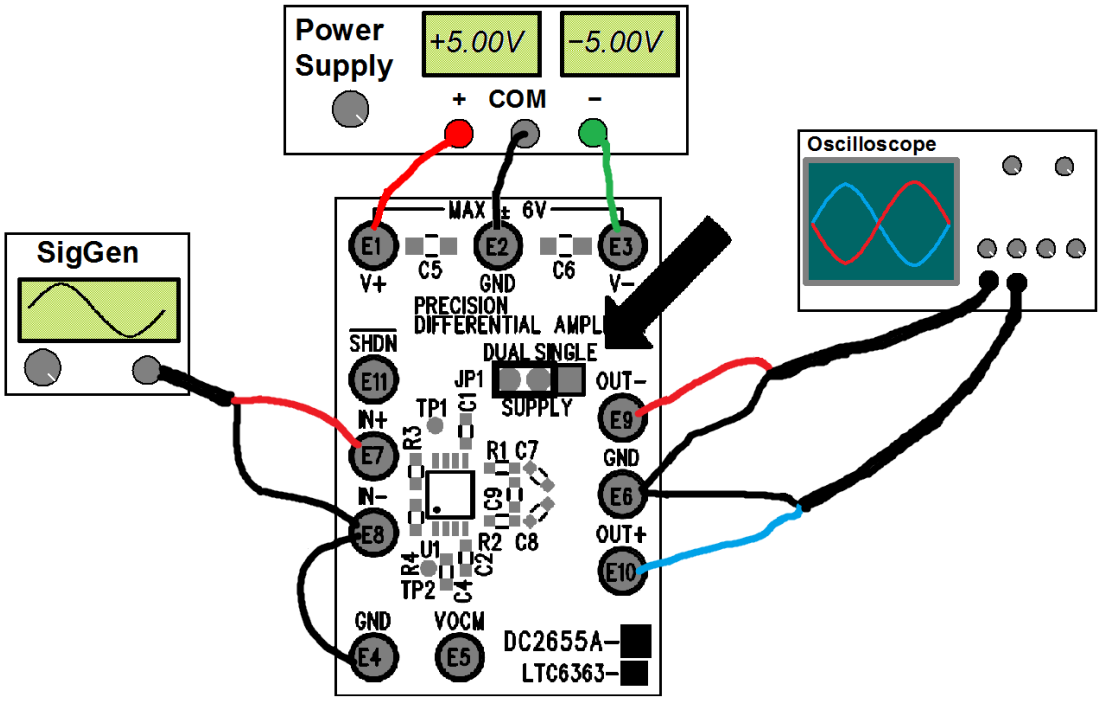

Figure 1b: DC2655A Connection Diagram (Dual Supply)

QUICK START PROCEDURE

Single-Ended Input to Differential Output

To configure the DC2655A for single-ended input to differential output, simply connect a DC bias (such as ground) to V_{IN}^- and connect the input signal to V_{IN}^+. The differential output is measured on V_{OUT}^+ and V_{OUT}^-. The unused input can also be grounded on the board by populating R3 or R4.

Differential Input to Differential Output

To configure the DC2655A for differential input to differential output, simply connect the differential input signal to V_{IN}^+ and V_{IN}^- respectively. The differential output is measured on V_{OUT}^+ and V_{OUT}^-.

External Output Common Mode Adjust

The DC2655A is by default configured to bias the output common mode at the voltage determined by the LTC6363 IC, which is at approximately the mid-point between the amplifier's V^+ and V^- pins. (For example, if single supply is used, the output common mode will be at half the V^+ voltage).

To set a different value for the output common mode voltage, apply the desired DC bias to the VOCM pin at E5. This will overdrive the on-chip resistor dividers.

Output Filter

The DC2655A is configured by default without filtering at the input or output. To install an onboard lowpass filter, populate C7, C8, and/or C9 and replace the 0Ω R1/R2 with appropriate resistor values.

Layout

The DC2655A PCB layout demonstrates the known best-practices of pcb layout to get the best performance out of the LTC6363. A ground plane is used, and supply bypass capacitors are close to the supply pins. Use a symmetrical layout around the analog inputs and outputs to minimize the effects of parasitic elements. However, the DC2655A is designed to accommodate both single supply and dual supply circuits. A PCB design for a single supply application would connect the amplifier's V^- pin directly to the copper ground plane and use only one supply bypass capacitor directly between V^+ and ground.

Connectors and Jumpers

JP1: Jumper toggles the SUPPLY between DUAL and SINGLE power supplies. If set to dual supply, connect a negative supply voltage to V^-.

V^+: Connect to Positive Power Supply.

GND: Connect to Ground. Available at multiple turrets on the board, all shorted together internally. Only need to connect one, others can be used as ground point for measurements.

V^-: Negative Power Supply voltage. No need to connect if JP2 is set to single supply.

SHDN: Externally drives the SHDN pin. No need to connect, unless desired to turn the amplifier ON and OFF with a logic signal. (See LTC6363 data sheet for logic levels.)

VOCM: Externally drives the VOCM pin. The voltage on this pin sets the output common mode voltage level. If left floating (default setting), then an internal resistor divider develops a voltage that is approximately midway between the LTC6363 V^+ and V^- supply rails.

IN^+: Connect noninverting input signal voltage to the amplifier circuit.

IN^-: Connect inverting input signal voltage to the amplifier circuit.

OUT^-: Measure inverting output signal voltage from the amplifier circuit.

OUT^+: Measure noninverting output signal voltage from the amplifier circuit.

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