

LTC1661/LTC1662 2-Channel, 10-Bit, Micropower DACs

DESCRIPTION

Demonstration circuit 2789A features the [LTC®1661/LTC1662](#), 2-channel, 10-Bit, micropower DACs in an 8-lead MSOP package. The DC2789A also features an [LTC1258-4.1](#), a lower voltage reference.

The LTC1661/LTC1662 are ultralow power, fully buffered voltage output, dual 10-bit digital-to-analog converters (DACs).

Each LTC1662 channel draws just 1.7µA (typ) total supply-plus reference operating current, yet is capable of supplying DC output currents in excess of 1mA and reliably driving capacitive loads of up to 1000pF. Each LTC1661 channel draws 30µA.

Design files for this circuit board are available at <http://www.linear.com/demo/DC2789A>

All registered trademarks and trademarks are the property of their respective owners.

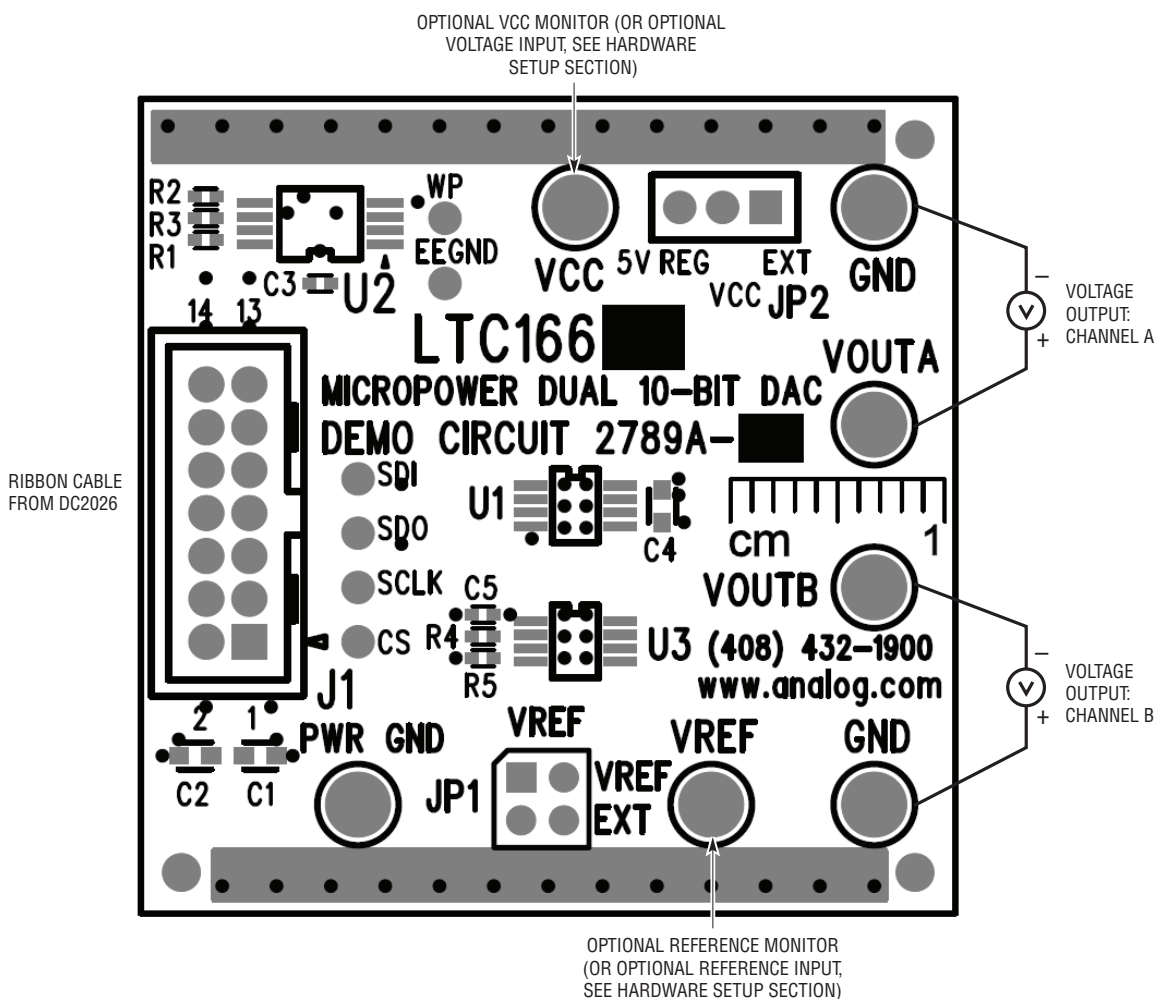


Figure 1. Connection Diagram

ASSEMBLY OPTIONS

ASSEMBLY TYPE	PART NUMBER	DAC CHANNELS	BITS	TYPICAL CURRENT (I_{CC})
DC2789A-A	LTC1661	2	10	95 μ A
DC2789A-B	LTC1662	2	10	3 μ A

QUICK START PROCEDURE

1. Download and install QuikEval™ from:
www.linear.com/quikeval
2. Connect a DC590 controller or DC2026 Linduino® with the DC590 emulator firmware to the DC2789A with the supplied ribbon cable. If the DC590 emulator firmware is not installed on the DC2026, refer to the Linduino manual to reinstall it.
3. Connect the controller to the host PC's USB port and run QuikEval. The DC2789A software will be downloaded and installed, after which the GUI will appear as shown in Figure 2. The control panel gives access to the LTC1661/LTC1662's functionality including output voltage for both channels and sleep mode. If an external reference is used the reference voltage can also be changed.

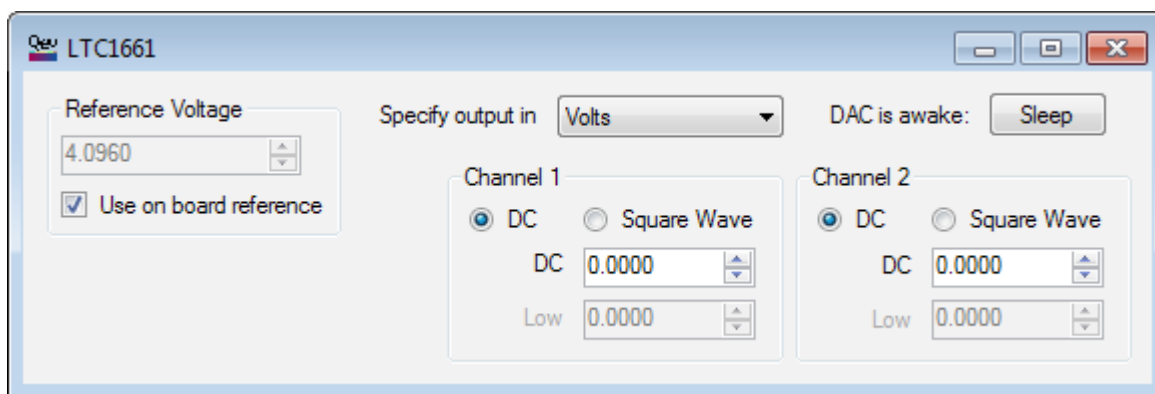


Figure 2. QuikEval Module

USING EXTERNAL REFERENCE FOR THE DC2789A

To use an external reference to drive the DC2789A, move the jumper named V_{REF} (JP1) from the V_{REF} position to the EXT position. Use the REF turret to drive the reference voltage. If the QuikEval module is being used, the new reference voltage will need to be manually set.

Using External Supplies for V_{CC}

As a default, the DC2789A is powered from the DC590/DC2026. It can be powered by an external supply as well. Move the jumper labeled V_{CC} from 5V reg to EXT and connect the low noise supply to the V_{CC} turret.

Connectors and Turrets

J1: Interface connector to DC590 controller or Lin-duino. Provides V_{CC} power, SPI interface, and board identification.

V_{CC} : Normally V_{CC} is supplied by the DC590 or DC2026. By changing JP2 (V_{CC}) an external voltage can be used to power the DC2789A. This voltage should be between 2.7V to 5.5V.

GND/PWR GND: Additional ground posts and exposed ground plane around the board edge allow solid connection to prototype circuitry and measurement equipment.

V_{REF} : Connection to the REF pin. In internal reference mode, the reference voltage may be monitored at this point. Placing V_{REF} jumper in EXT position allows an external low noise reference to be connected to this point. External references should be between 0V and V_{CC} .

V_{OUTA} : Output supply voltage for DAC channel A.

V_{OUTB} : Output supply voltage for DAC channel B.

Jumpers

V_{REF} (JP1): Selects internal or external reference mode. (Default: V_{REF})

V_{CC} (JP2): Selects between 5V regulated voltage from the DC590/DC2026 or an external voltage supply. (Default: 5V Reg)

Test Points

The SPI bus is available on a row of through-hole test points next to J1 that may be used to monitor the bus or drive the bus with an external controller.

EEGND, WP: For factory use only.

**ESD Caution**

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

Legal Terms and Conditions

By using the evaluation board discussed herein (together with any tools, components documentation or support materials, the "Evaluation Board"), you are agreeing to be bound by the terms and conditions set forth below ("Agreement") unless you have purchased the Evaluation Board, in which case the Analog Devices Standard Terms and Conditions of Sale shall govern. Do not use the Evaluation Board until you have read and agreed to the Agreement. Your use of the Evaluation Board shall signify your acceptance of the Agreement. This Agreement is made by and between you ("Customer") and Analog Devices, Inc. ("ADI"), with its principal place of business at One Technology Way, Norwood, MA 02062, USA. Subject to the terms and conditions of the Agreement, ADI hereby grants to Customer a free, limited, personal, temporary, non-exclusive, non-sublicensable, non-transferable license to use the Evaluation Board FOR EVALUATION PURPOSES ONLY. Customer understands and agrees that the Evaluation Board is provided for the sole and exclusive purpose referenced above, and agrees not to use the Evaluation Board for any other purpose. Furthermore, the license granted is expressly made subject to the following additional limitations: Customer shall not (i) rent, lease, display, sell, transfer, assign, sublicense, or distribute the Evaluation Board; and (ii) permit any Third Party to access the Evaluation Board. As used herein, the term "Third Party" includes any entity other than ADI, Customer, their employees, affiliates and in-house consultants. The Evaluation Board is NOT sold to Customer; all rights not expressly granted herein, including ownership of the Evaluation Board, are reserved by ADI. **CONFIDENTIALITY.** This Agreement and the Evaluation Board shall all be considered the confidential and proprietary information of ADI. Customer may not disclose or transfer any portion of the Evaluation Board to any other party for any reason. Upon discontinuation of use of the Evaluation Board or termination of this Agreement, Customer agrees to promptly return the Evaluation Board to ADI. **ADDITIONAL RESTRICTIONS.** Customer may not disassemble, decompile or reverse engineer chips on the Evaluation Board. Customer shall inform ADI of any occurred damages or any modifications or alterations it makes to the Evaluation Board, including but not limited to soldering or any other activity that affects the material content of the Evaluation Board. Modifications to the Evaluation Board must comply with applicable law, including but not limited to the RoHS Directive. **TERMINATION.** ADI may terminate this Agreement at any time upon giving written notice to Customer. Customer agrees to return to ADI the Evaluation Board at that time. **LIMITATION OF LIABILITY.** THE EVALUATION BOARD PROVIDED HEREUNDER IS PROVIDED "AS IS" AND ADI MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND WITH RESPECT TO IT. ADI SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS, ENDORSEMENTS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, RELATED TO THE EVALUATION BOARD INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT WILL ADI AND ITS LICENSORS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES RESULTING FROM CUSTOMER'S POSSESSION OR USE OF THE EVALUATION BOARD, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DELAY COSTS, LABOR COSTS OR LOSS OF GOODWILL. ADI'S TOTAL LIABILITY FROM ANY AND ALL CAUSES SHALL BE LIMITED TO THE AMOUNT OF ONE HUNDRED US DOLLARS (\$100.00). **EXPORT.** Customer agrees that it will not directly or indirectly export the Evaluation Board to another country, and that it will comply with all applicable United States federal laws and regulations relating to exports. **GOVERNING LAW.** This Agreement shall be governed by and construed in accordance with the substantive laws of the Commonwealth of Massachusetts (excluding conflict of law rules). Any legal action regarding this Agreement will be heard in the state or federal courts having jurisdiction in Suffolk County, Massachusetts, and Customer hereby submits to the personal jurisdiction and venue of such courts. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement and is expressly disclaimed.