Burr-Brown Products
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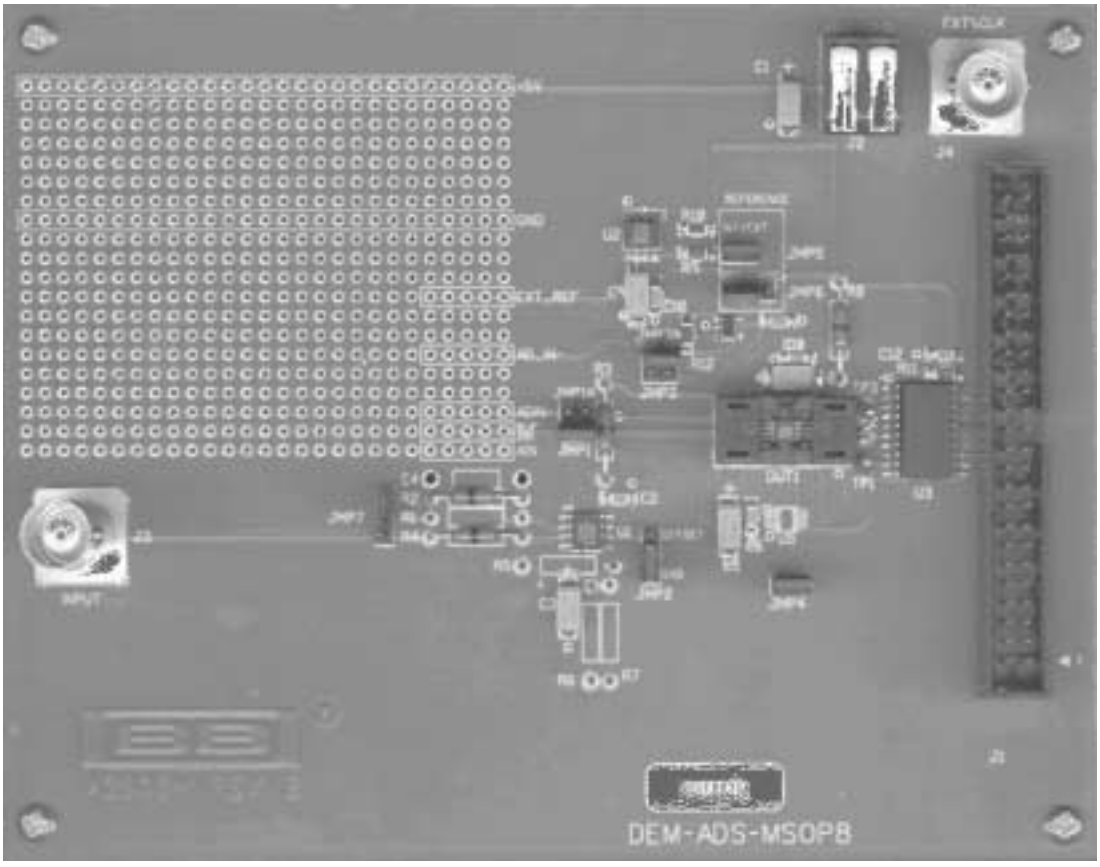
DEM-ADS-MSOP8
A/D CONVERTER
EVALUATION FIXTURE



FEATURES

- **SUPPORTS 8 DIFFERENT CONVERTERS: ADS7816, ADS7817, ADS7818, ADS7822, ADS7834, ADS8320, ADS8321, and ADS8324**
- **USE WITH DEM-CIB AND BBEval SOFTWARE**

DESCRIPTION

The DEM-ADS-MSOP8 is an evaluation tool for several of Burr-Brown's pin-compatible 12- and 16-bit Analog-to-Digital (A/D) converters in the MSOP-8 package. It provides a flexible input-buffer circuit and reference circuit. Converters may be clocked directly or from an external clock.

See Figure 1 for a block diagram of the DEM-ADS-MSOP8 setup. The DEM-ADS-MSOP8 is designed to be used with the DEM-CIB Computer Interface Board and Burr-Brown Evaluation (BBEval) A/D converter evaluation software.

TEXAS INSTRUMENTS

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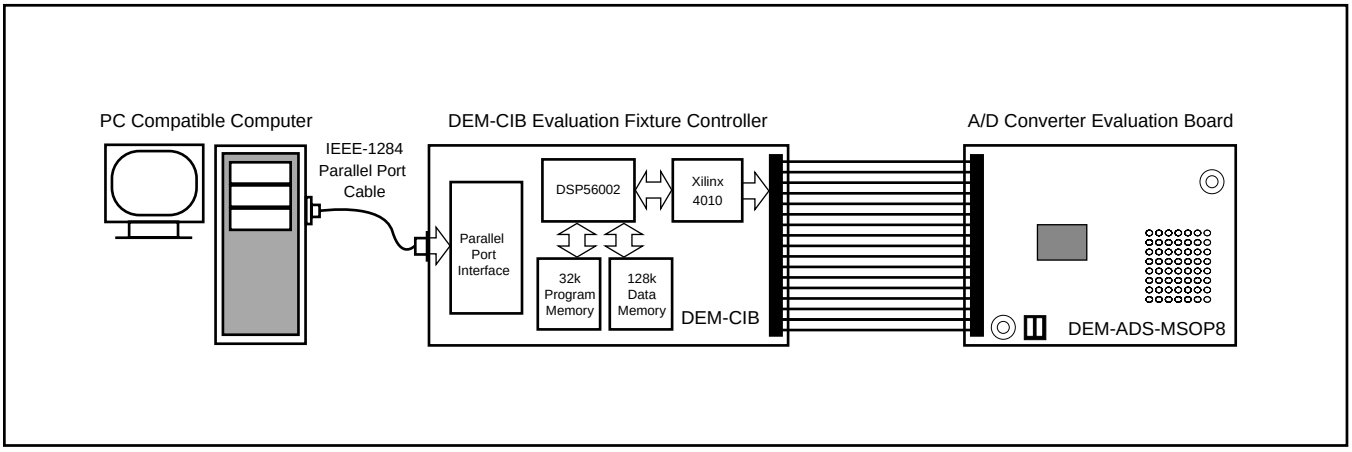

FIGURE 1. DEM-ADS-MSOP8 Setup and Block Diagram.

DEM-ADS-MSOP8 KIT CONTENTS

The DEM-ADS-MSOP8 contains the following:

- One DEM-ADS-MSOP8 Evaluation Board
- Five ADS7822E Samples
- Five ADS8320E Samples
- This Data Sheet

All the software needed to set up and use the DEM-ADS-MSOP8 is included in the DEM-CIB kit, on the BBEval installation CD.

EQUIPMENT NEEDED

To use the DEM-ADS-MSOP8, the following equipment is required:

- PC-Compatible Computer Running Windows® 95 or Windows® 98
- +5V DC Power Supply
- DEM-CIB Computer Interface Board from Burr-Brown
- BBEval Software.

Windows is a registered trademark of Microsoft.

SETUP AND INSTALLATION

SOFTWARE SETUP

Before setting up the DEM-ADS-MSOP8, make sure the BBEval software is installed on your PC. Instructions for installation are included in the DEM-CIB kit.

HARDWARE SETUP

Unpack the kit contents and verify that you have received everything listed in the section titled “DEM-ADS-MSOP8 Kit Contents”.

Connect a +5V DC power supply to the DEM-CIB. The DEM-CIB utilizes a removable terminal block connector. Place the ends of the wires from the power supply into the connector and tighten down the set screws, making sure you have connected the power-supply wires with the correct polarity, as marked on the DEM-CIB board.

Place one of the sample devices in the socket on the DEM-ADS-MSOP8 board, making sure that pin-1 positioning is observed.

Connect the DEM-ADS-MSOP8 to the DEM-CIB board using the 50-pin ribbon cable supplied with the DEM-CIB. Connect the +5V power supply to the DEM-ADS-MSOP8.

When you are sure that the power supply is connected correctly, turn on the +5V power supply. A small LED should light on the DEM-CIB indicating that it has power.

Connect the DEM-CIB to your computer with the included IEEE-1284 cable. NOTE: Due to the high speeds of data communicated across this link, do not use any parallel cable other than an IEEE-1284 cable.

GETTING STARTED USING THE DEM-ADS-MSOP8

Once the DEM-CIB and DEM-ADS-MSOP8 have been setup as described above, turn the power off. You now need to configure the DEM-ADS-MSOP8’s jumpers and hardware so that it will work correctly for the device you are evaluating and the configuration you wish to evaluate.

Refer to the schematic diagram in Figure 5 to see the configurable portions of the circuit. The DEM-ADS-MSOP8 has five jumpers, and several replaceable passive components. As delivered from the factory, the board is configured for use with an ADS8320E with a 2.5V reference and thus, a 2.5V input range. The input buffer is configured as a unity-gain buffer. The jumpers and components installed by default are shown in Table I.

Component	State
R1	Not installed
R2	0Ω
R3	0Ω
R4	0Ω
R5	Not installed
R6	Not installed
R7	Not installed
R8	0Ω
C4	Not installed
JMP1	Installed
JMP1A	Not Installed
JMP2	Shorts pins 2 and 3 (GND)
JMP3	Not Installed
JMP3A	Installed
JMP4	Installed
JMP5	Installed
JMP6	Shorts pins 2 and 3
JMP7	Shorts pins 2 and 3

Table I. Default Component Settings.

To quickly test the DEM-ADS-MSOP8, install an ADS8320E in the DUT socket on the board, and power up the setup. Connect a 0V to +2.5V signal source to J3.

Launch BBEval on your PC, go to the Setup menu, choose "Select Demo Board", and select the DEM-MSOP8.

After selecting the appropriate demo board, select "Setup Demo Board" from the Setup menu, and choose the ADS8320 from the list of devices.

Next, return to the Setup menu and choose "Acquistion Parameters" to set up BBEval for the tests you wish to perform.

Do a single acqusition in BBEval, and you should be able to see your input signal on the scope display of BBEval. For more information on BBEval, see the Help menu in BBEval.

REFERENCE CONFIGURATIONS

The DEM-ADS-MSOP8 has provisions for three different reference options: an on-board 2.5V reference, the power-supply voltage, or an external reference. The reference circuit is shown in Figure 2.

To use the on-board 2.5V reference, JMP5 should be installed, and JMP6 should be set to connect pins 2 and 3, so that the reference voltage comes from the op amp buffer to the DUT.

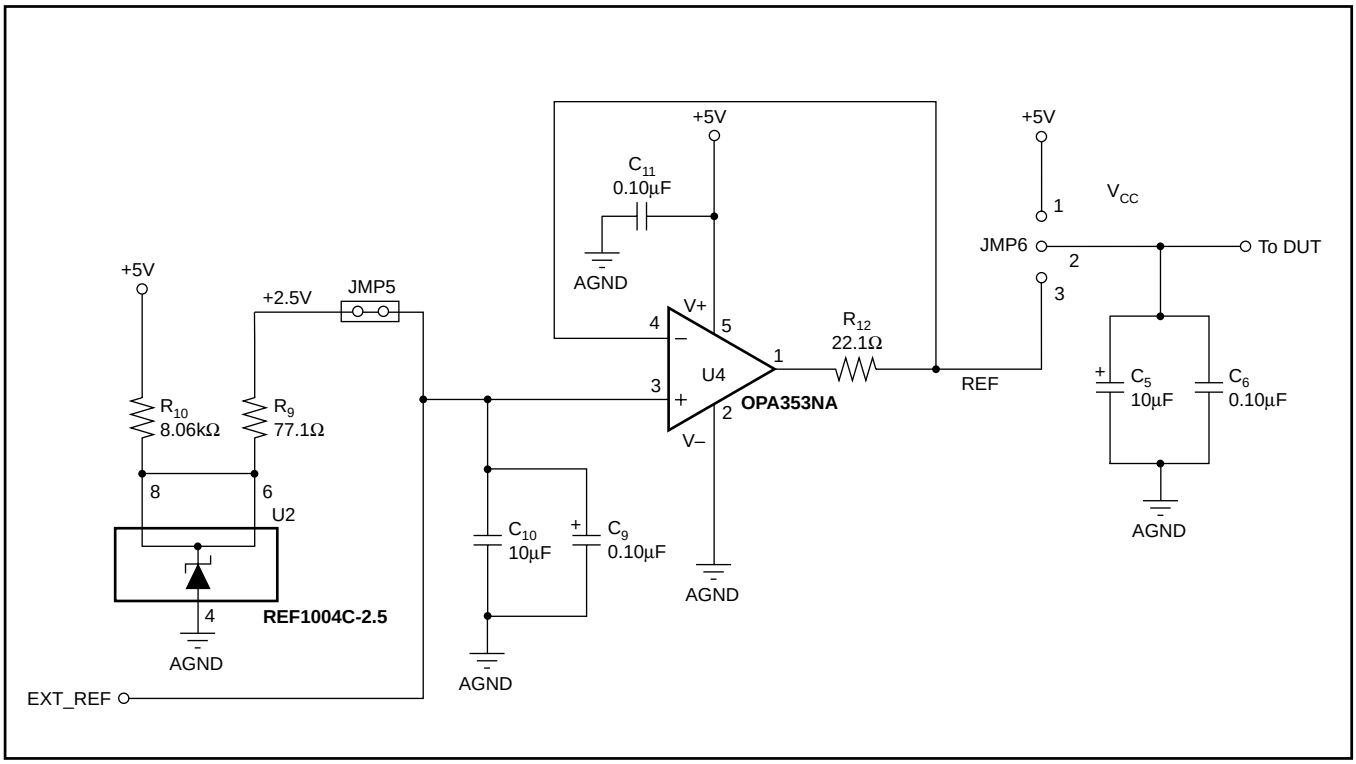

FIGURE 2. Reference Circuit.

To use the power-supply voltage as the reference, JMP6 should be set so that pins 1 and 2 are connected.

To use an external reference, JMP5 should be removed so that the REF1004-2.5 is no longer connected to the op amp; the external reference voltage will now be buffered by the U4. JMP6 should again be set to connect pins 2 and 3.

INPUT CONFIGURATIONS

Several input configurations are possible with the DEM-ADS-MSOP8 in order to accommodate different input ranges, offsets, and polarities. The input stage of the board is shown in Figure 3.

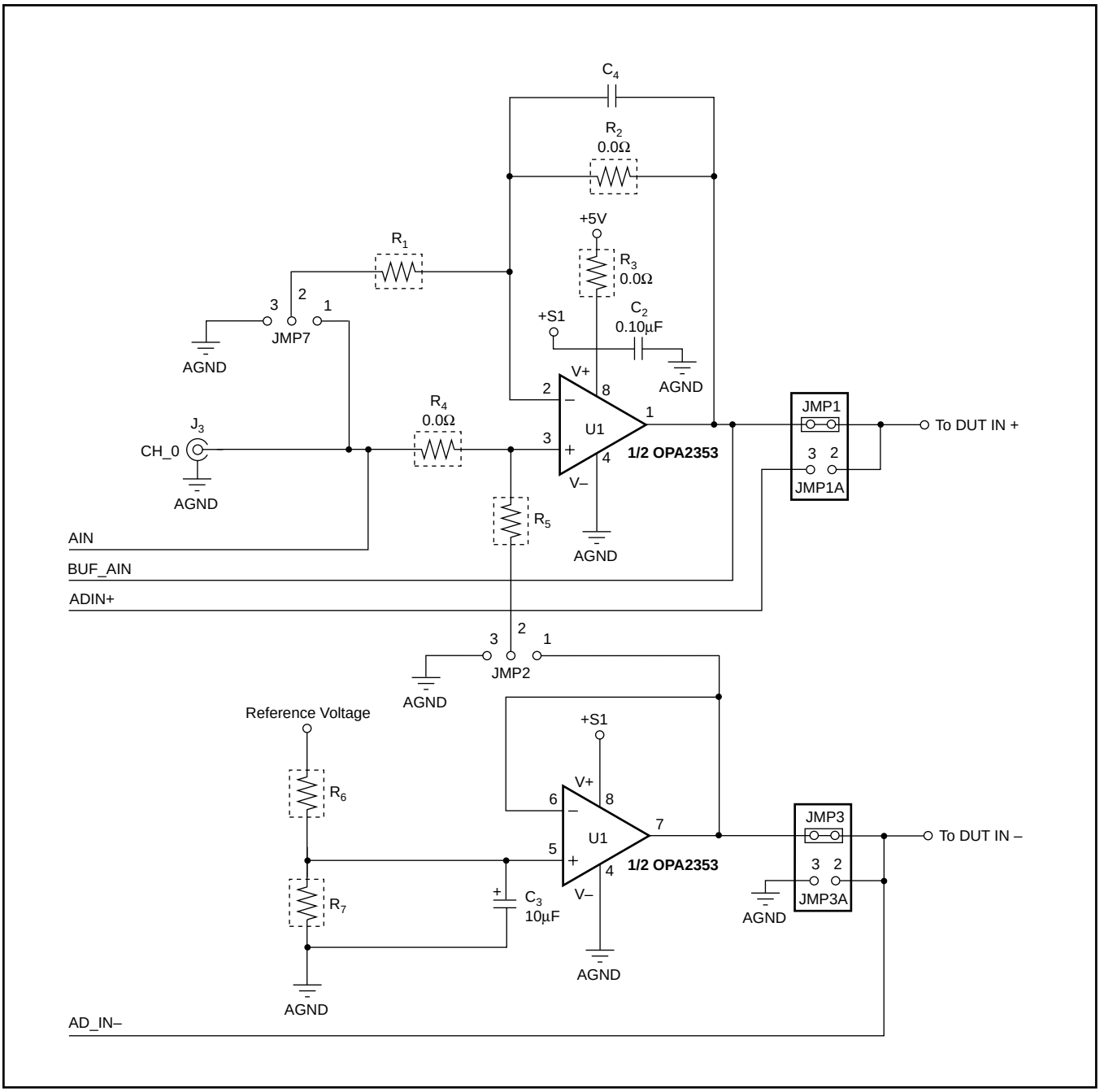

FIGURE 3. Input Buffer Circuit.

Components shown in boxes are replaceable, allowing users to change component values to select different gains.

Resistors R_3 and R_8 are generally 0Ω, but can be replaced with a resistor of 10Ω to 100Ω to provide some power-supply filtering.

Table II shows some possible configurations for this input stage, assuming a 2.5V reference voltage and using a non-inverting configuration. Many other configurations are possible. Items in the table marked "–" mean those components are not to be installed.

CLOCKING

Figure 4 shows the Setup Demo-Board dialog window which you will see when you select it from the Setup menu.

You must tell the program how many clock cycles go by for each conversion. This number is entered into the Chip Select Divider field; for the 12-bit converters, this number is usually 16, while the 16-bit converters require 24 clocks.

If you wish to use the clock provided to the part from the DEM-CIB, check the "Internal Clock" checkbox; the DEM-CIB will then produce a clock which is at the appropriate frequency for the sample rate you have requested and which meets the chip-select divider criterion.

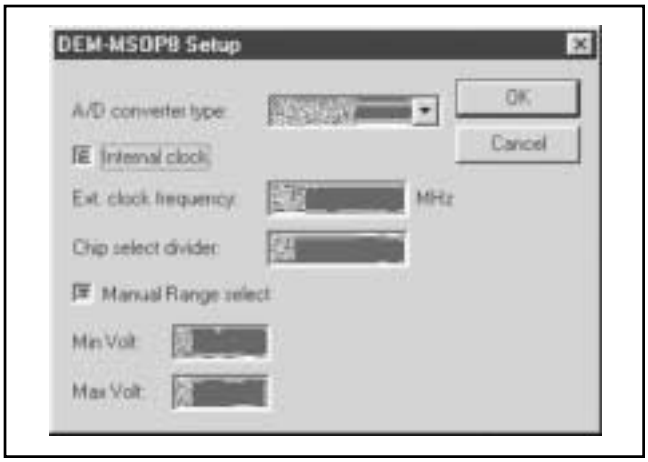

FIGURE 4. Setup Demo Board Dialog Box.

If you wish to use an external clock, make sure that the "Internal Clock" checkbox is not checked, and enter a number into the "Ext. Clock Frequency" field. Supply the external clock to J4 of the DEM-ADS-MSOP8. This clock signal is routed through the FPGA on the DEM-CIB directly back to the A/D converter on the DEM-ADS-MSOP8 board. Thus, you should consult the data sheet of the part you are testing on the DEM-ADS-MSOP8 to make sure your external clock meets all the criteria required for that part.

INPUT RANGE	OUTPUT RANGE	R_4	R_1	R_2	R_5	R_6	R_7	V_{REF}	JMP7	JMP2
0V - 2.5V	0V - 2.5V	0	–	0	–	–	–	2.5V	–	–
0V - 1.25V	0V - 2.5V	0	10kΩ	10kΩ	–	–	–	2.5V	GND	–
0V - 5V	0V - 2.5V	10kΩ	–	0	10kΩ	–	–	2.5V	–	GND
0V - 10V	0V - 2.5V	30kΩ	–	0	10kΩ	–	–	2.5V	–	GND
±1.25V	0V - 2.5V	10kΩ	10kΩ	10kΩ	10kΩ	10kΩ	10kΩ	2.5V	GND	OFFSET
±2.5V	0V - 2.5V	20kΩ	4kΩ	2kΩ	10kΩ	10kΩ	10kΩ	2.5V	GND	OFFSET
±5V	0V - 2.5V	20kΩ	4kΩ	2kΩ	10kΩ	0	–	2.5V	GND	OFFSET
±10V	0V - 2.5V	80kΩ	80kΩ	10kΩ	10kΩ	10kΩ	10kΩ	2.5V	GND	OFFSET
0V - 2.5V	0V - 5V	0	10kΩ	10kΩ	–	–	–	2.5V	GND	–
0V - 1.25V	0V - 5V	0	4klΩ	12kΩ	–	–	–	2.5V	GND	–
0V - 5V	0V - 5V	0	–	0	–	–	–	2.5V	–	–
0V - 10V	0V - 5V	10kΩ	–	0	10kΩ	–	–	2.5V	–	GND
±1.25V	0V - 5V	10kΩ	10kΩ	30kΩ	10kΩ	10kΩ	10kΩ	2.5V	GND	OFFSET
±2.5V	0V - 5V	20kΩ	10kΩ	20kΩ	10kΩ	10kΩ	10kΩ	2.5V	GND	OFFSET
±5V	0V - 5V	20kΩ	20kΩ	10kΩ	10kΩ	0	–	2.5V	GND	OFFSET
±10V	0V - 5V	20kΩ	10kΩ	15kΩ	5kΩ	0	–	2.5V	GND	OFFSET

NOTE: Items marked "–" mean those components are not to be installed.

TABLE II. Non-Inverting Configurations for 2.5V Reference.

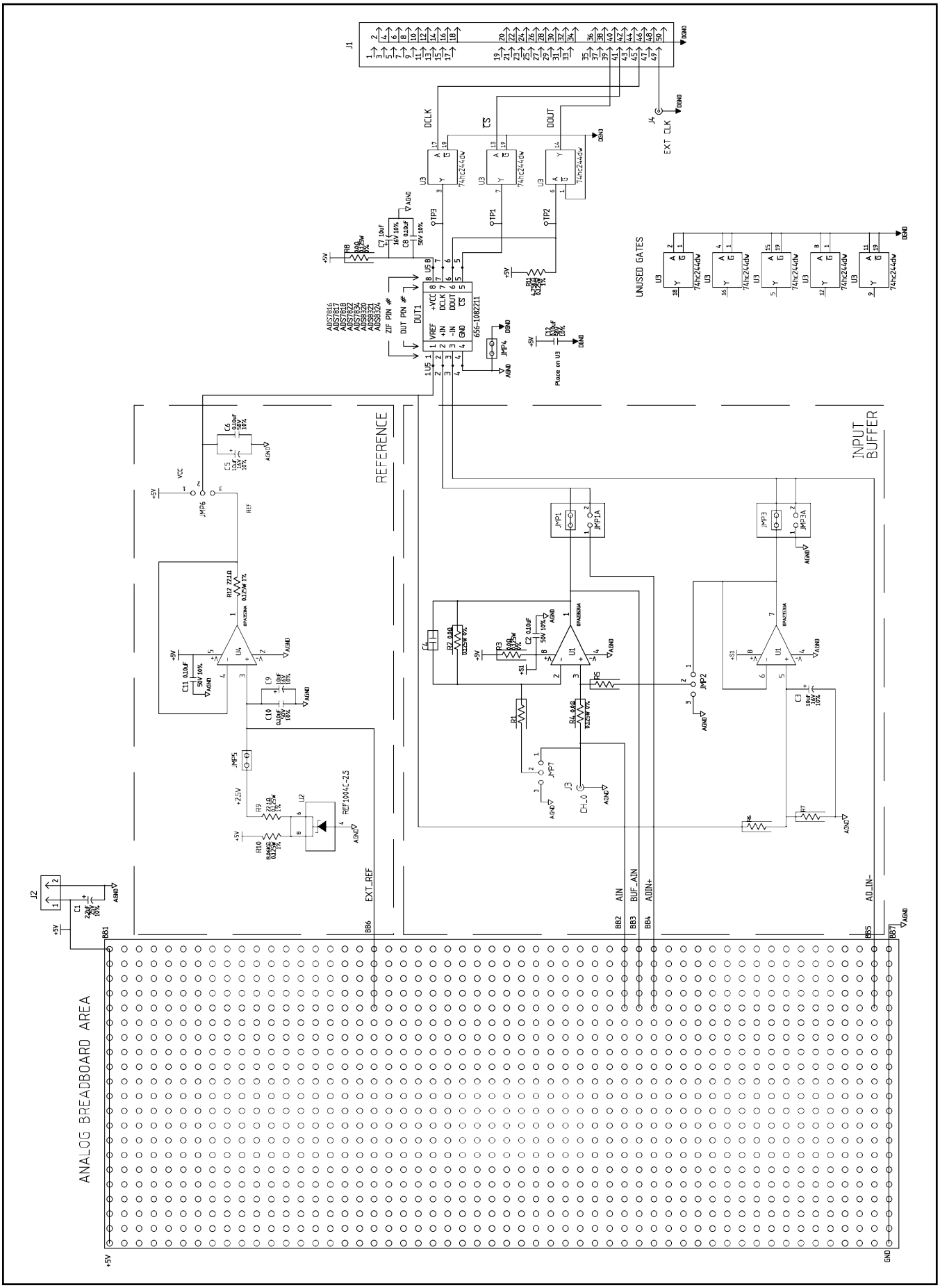

FIGURE 5. DEM-ADS-MSOP8 Schematic Diagram.

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