

MAXIM

MAX6955 Evaluation Kit

Evaluates: MAX6955

General Description

The MAX6955 evaluation kit (EV kit) is designed to evaluate the MAX6955 light-emitting diode (LED) display driver with a 2-wire interface. The EV kit board contains two MAX6955 LED display drivers on symmetrical sides of the board, allowing a 16-digit display using sixteen 14-segment alphanumeric LEDs. The DB-25 connector allows a PC's parallel (printer) port to provide the 2-wire interface. The Windows® software provides a friendly graphical user interface (GUI) to exercise the features of the MAX6955 by allowing on-the-fly text and numeric entry and access to all relevant registers. The software includes multiple tabs for accessing the various registers and maintains a consistent format with controls on the left side of the software's main window pertaining to U1, located on the left side of the EV kit board. Similarly, all the controls on the right side of the software's main window pertain to U2, located on the right side of the EV kit board. The EV kit board requires a 3.3VDC or 5VDC power supply and jumpers JU1–JU4 allow the user to manually modify the device address of U1 or U2.

Order the MAX6955EVKIT for comprehensive evaluation of the MAX6955 using a PC with an available parallel port.

Features

- ◆ Proven PC Board Layout
- ◆ Windows 95/98/ME/NT/2000/XP-Compatible Evaluation Software
- ◆ 2-Wire Serial Interface
- ◆ Sixteen 14-Segment Bright LEDs
- ◆ Fully Assembled and Tested

Ordering Information

PART	TEMP RANGE	IC PACKAGE
MAX6955EVKIT	0°C to +70°C	36 SSOP

MAX6955 EV Kit Files

PROGRAM	DESCRIPTION
INSTALL.EXE	Installs the EV kit software
MAX6955.EXE	Application program
HELPPFILE.HTM	MAX6955 EV kit Helpfile
PORT95NT.EXE	SST's freeware DLPortIO driver package
UNINST.INI	Uninstalls the EV kit software

Component List

DESIGNATION	QTY	DESCRIPTION
C1	1	22µF ±20%, 6.3V X5R ceramic capacitor (1210) TDK C3225X5R0J226M
C2	1	12pF ±5%, 50V COG ceramic capacitor (0603) TDK C1608COG1H120JT
C3, C5	2	0.1µF ±10%, 25V X7R ceramic capacitors (0603) TDK C1608X7R1E104KT
C4, C6	2	1µF ±20%, 10V X5R ceramic capacitors (0805) TDK C2012X5R1A105M
D1–D8	8	0.54in dual 14-segment alphanumeric LEDs Lumex LDD-F5406RI Fairchild MDA6140C
D9–D12	4	Zener diodes, Vz = 5.1V (3-pin SOT23), top mark: KZ2 or Z2 Diodes Inc. BZX84C5V1

DESIGNATION	QTY	DESCRIPTION
J1	1	Male DB-25 right-angle plug
J2, J3	2	20-pin dual-row 2 x 10 headers
JU1–JU4	4	5-pin headers
N1, N2	2	N-channel MOSFETs (3-pin SOT23), top mark: 702 Central Semiconductor 2N7002
Q1, Q2	2	Bipolar junction transistors (3-pin SOT23), top mark: C1A Central Semiconductor CMPT3904
R1, R5	2	100kΩ ±5% resistors (1206)
R2, R6	2	13kΩ ±5% resistors (1206)
R3, R4, R7–R10, R13–R22	16	47kΩ ±5% resistors (1206)
R11, R12	2	100kΩ ±1% resistors (1206)
U1, U2	2	MAX6955AAX (36-pin SSOP)
None	4	Shunts

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MAXIM

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For pricing, delivery, and ordering information, please contact Maxim/Dallas Direct! at 1-888-629-4642, or visit Maxim's website at www.maxim-ic.com.

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Component Suppliers

SUPPLIER	PHONE	WEBSITE
Central Semiconductor	631-435-1110	www.centrasemi.com
Diodes Inc.	805-446-4800	www.diodes.com
Fairchild Semiconductor	888-522-5372	www.fairchildsemi.com
Lumex, Inc.	800-278-5666	www.lumex.com
Scientific Software Tools, Inc.	610-891-1640	www.sstnet.com
TDK	847-803-6100	www.component.tdk.com

Quick Start

Recommended Equipment

Before beginning, the following equipment is needed:

- MAX6955EVKIT
- A 3.3VDC or 5VDC power supply
- PC with Windows 95/98/ME/NT/2000/XP
- An available parallel port (female DB-25 connector on back of PC)
- A standard 25-pin, straight-through, male-to-female cable to connect the PC's parallel port to the MAX6955 EV kit board

Procedure

- 1) Connect a cable from the PC's parallel port to the MAX6955 EV kit board. Use a 25-pin, straight-through, female-to-male cable.
- 2) Install the supplied CD into the CD drive of your PC and run INSTALL.EXE. When the installer window shows up on the screen, press the **INSTALL** button. The MAX6955 program files are copied and icons are created in the **Programs** section within the **Start** menu. When you see the self-extracting DLPortIO driver install window appear on the screen, press the **Yes** button. This automatically unpacks the compressed files and runs the DLPortIO driver installer. If using Windows NT, 2000, or XP, you must have administrator privileges on your PC. If you do not, then contact your system administrator to allow installation. You need to restart your PC after installing the DLPortIO driver.

- 3) Connect a 3.3VDC or 5VDC power supply between the VCC and GND pads on the MAX6955 EV kit board.
- 4) Start the MAX6955 EV kit program by double clicking its icon located in the **Programs** section within the **Start** menu.
- 5) The program automatically detects the MAX6955 EV kit board and displays 2-wire Hardware Detected in a green font.
- 6) The MAX6955 EV kit board and MAX6955 EV kit software should automatically display MAX6955 EVKIT.

Software Description

The EV kit software's main window, shown in Figure 1, allows on-the-fly text and numeric entry and also allows access to all the relevant registers for easy configuration. The controls on the left side of the software's main window control U1 and similarly, the controls on the right side of the software's main window control U2. Each register has its own tab in the order of the MAX6955's address map. A 2-wire operation field is present at the very bottom of the software's main window, which shows the results of the last 2-wire operation.

Alphanumeric Entry for U1

In the upper left-hand corner of the software's main window is the **Alphanumeric Entry for U1** group box. This group box has five main controls:

- **Plane** group box
- **U1 Address (write)** combo box
- **U1 Address (read)** combo box
- Alphanumeric entry field
- **Decimal Point** checkbox and individual decimal point checkboxes

The first control is the **Plane** group box, which allows the user to select which plane to write to. The radio button choices in the **Plane** group box are **P0 and P1, P0, and P1**. It is important to note that once one of these plane radio buttons is selected, the software automatically takes the text or numbers that exist in the Alphanumeric Entry field and writes them to the display.

The second and third controls are the **U1 Address (write)** and the **U1 Address (read)** combo boxes. These device-address combo boxes default to 0xCA for write and 0xCB for read. If you modify the default device address, change the jumper settings on JU1 and JU2 on the MAX6955 EV kit board. If the default address settings are changed on the board, the user must also manually select the correct device address

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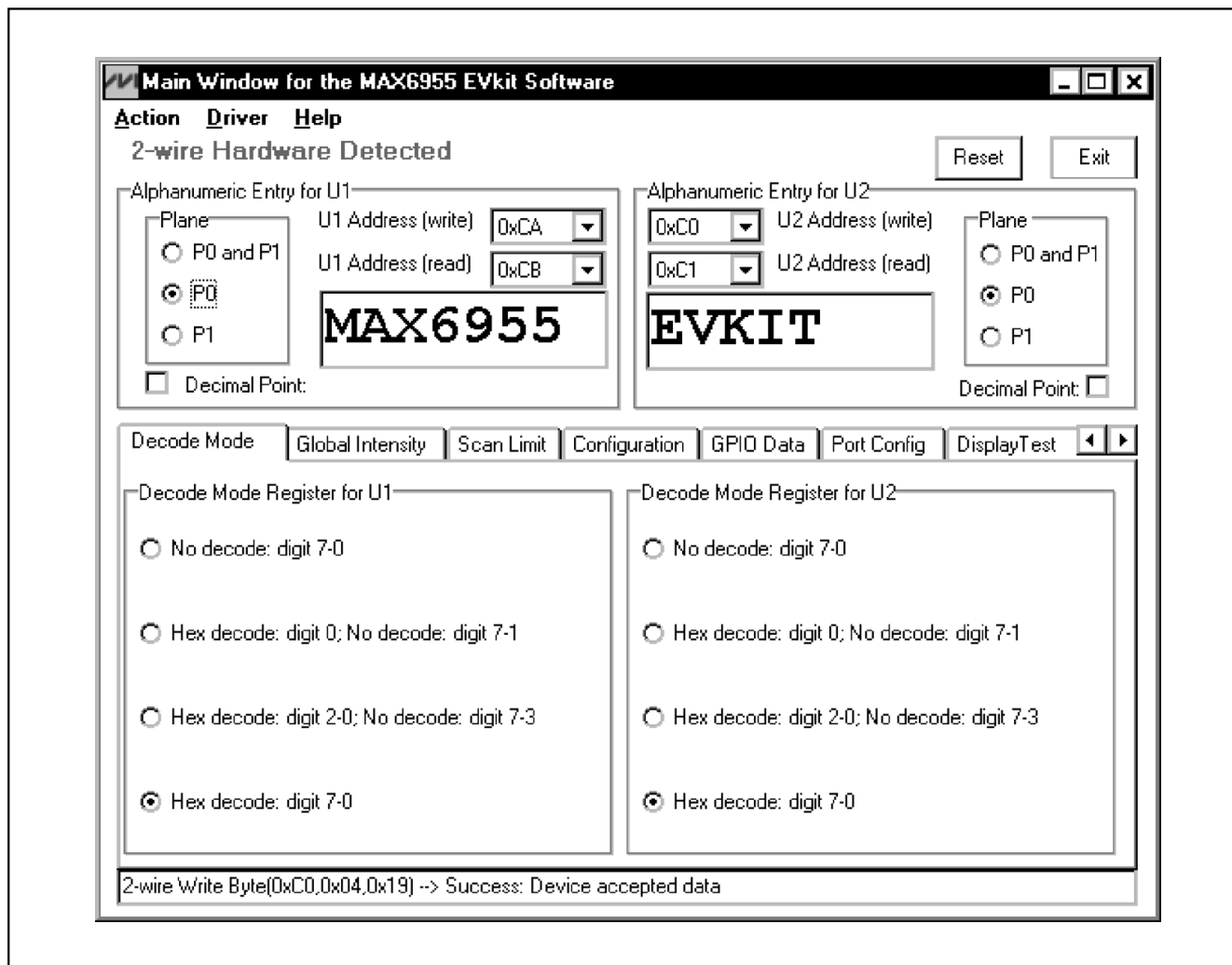


Figure 1. MAX6955 EV Kit Software's Main Window

in the **U1 Address (write)** and the **U1 Address (read)** combo boxes. Table 1 lists the device address selection for the various JU1 and JU2 jumper settings.

The fourth control is the Alphanumeric Entry field, which displays MAX6955 at the start of the program. The user may type letters, numbers, apostrophes, commas, or even spaces in the Alphanumeric Entry field using the computer's keyboard. The Alphanumeric Entry field also supports standard word processing features like highlighting, insert, and delete. Anytime an invalid character is typed into the Alphanumeric Entry field, such as an @, a character error message box pops up, indicating an invalid character was typed.

Anytime a valid character is typed into the Alphanumeric Entry field, the software automatically writes it to the corresponding digit on the display.

The last control type within the **Alphanumeric Entry for U1** group box is the **Decimal Point** checkbox and the individual decimal point checkboxes. When the **Decimal Point** checkbox is checked, all of the individual decimal point checkboxes become visible. When the **Decimal Point** checkbox is unchecked, all of the individual decimal point checkboxes are hidden. Checking one of the individual decimal point checkboxes automatically lights up the corresponding decimal point on the board.

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Alphanumeric Entry for U2

The **Alphanumeric Entry for U2** group box is in the upper right-hand corner of the software's main window. This group box has five main controls:

- **Plane** group box
- **U2 Address (write)** combo box
- **U2 Address (read)** combo box
- Alphanumeric Entry Field
- **Decimal Point** checkbox and individual decimal point checkboxes

The first control is the **Plane** group box, which allows the user to select which plane to write to. The radio button choices in the **Plane** group box are **P0 and P1, P0, and P1**. It is important to note that once one of these plane radio buttons is selected, the software automatically takes the text or numbers that exist in the Alphanumeric Entry field and writes them to the display.

The second and third controls are the **U2 Address (write)** and the **U2 Address (read)** combo boxes. These device address combo boxes default to 0xC0 for write and 0xC1 for read. If you modify the default device address, change the jumper settings on JU3 and JU4 on the MAX6955 EV kit board. If the default address settings are changed on the board, the user must also manually select the correct device address in the **U2 Address (write)** and the **U2 Address (read)** combo boxes. Table 2 lists the device address selection for the various JU3 and JU4 jumper settings.

The fourth control is the Alphanumeric Entry field, which displays EVKIT at the start of the program. The user may type letters, numbers, apostrophes, commas, or even spaces in the Alphanumeric Entry field using the computer's keyboard. The Alphanumeric Entry field also supports standard word processing features like highlighting, insert, and delete. Anytime an invalid character is typed into the Alphanumeric Entry field, such as an @, a character error message box pops up, indicating an invalid character was typed. Anytime a valid character is typed into the Alphanumeric Entry field, the software automatically writes it to the corresponding digit on the display.

The last control type within the **Alphanumeric Entry for U2** group box is the **Decimal Point** checkbox and the individual decimal point checkboxes. When the **Decimal Point** checkbox is checked, all of the individual decimal point checkboxes become visible. When the **Decimal Point** checkbox is unchecked, all of the individual decimal point checkboxes are hidden.

Checking one of the individual decimal point checkboxes automatically lights up the corresponding decimal point on the board.

Register Tabs

The MAX6955 EV kit software has 43 register tabs for both U1 and U2, giving access to 86 unique registers. Any register tab can be selected by a mouse click when visible and not all register tabs can be visible at once. Scroll through the register tabs using the left and right scroll arrows located on the right-hand side of the software's main window. The order of the register tabs corresponds to the same order of the MAX6955's address map. Refer to the MAX6955 IC data sheet for details on the address map and a complete description of each register.

Keyboard Navigation

When you type on the keyboard, the system must know which control should receive the keys. Press the **tab** key to move the keyboard's focus from one control to the next. The focused control is indicated by a dotted outline. **Shift + tab** moves the focus to the previously focused control. Buttons respond to the keyboard's **space** bar. Some controls respond to the keyboard's **up** and **down** arrow keys. Activate the program's menu bar by pressing the **F10** key, then press the letter of the menu item you want. Most menu items have one letter underlined, indicating their shortcut key.

Hardware Description

The MAX6955 EV kit board is designed symmetrically so that the left side of the board pertains to U1 and the right side of the board pertains to U2. Thus, the first eight digits are driven by U1 and the last eight digits are driven by U2. An OSC pad for U1 is provided for external clock operation and an OSC_OUT pad for U2 is also provided for cascading additional MAX6955 devices. The DB-25 connector and associated circuitry are only needed for obtaining the 2-wire interface from the PC's parallel port and are not needed in typical applications. Connect the DB-25 connector, J1, to the PC's parallel port using a 25-pin straight-through, female-to-male cable. Four jumpers are on the EV kit board to modify the device address for U1 and U2. The two dual-row 20-pin headers, J2 and J3, are used for the I/O expander and keyscan features of U1 and U2, respectively.

Device Address Jumpers JU1–JU4

The MAX6955 EV kit board contains four jumpers in the top right-hand corner of the board. Jumpers JU1 and

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JU2 select the device address for U1 and jumpers JU3 and JU4 select the device address for U2. Table 1 lists the device address selection for the various JU1 and JU2 jumper settings. Table 2 lists the device address selection for the various JU3 and JU4 jumper settings. Before changing the default device address for U1 or U2, read the *Alphanumeric Entry for U1* and *Alphanumeric Entry for U2* sections pertaining to required modifications for the **Address (write)** and **Address (read)** combo boxes.

OSC and OSC_OUT Pads

An OSC pad for U1 is provided for external clock operation and an OSC_OUT pad for U2 is also provided for cascading additional MAX6955 devices. When the OSC pad is unconnected, the internal oscillator of U1

drives both U1 and U2 because OSC_OUT of U1 is directly connected to OSC of U2 with a trace on the board. It is also possible to drive the OSC pad of U1 with an external clock between 1MHz to 8MHz.

SCL, SDA, and GND Pads

The MAX6955 EV kit utilizes the PC's parallel port to generate a 2-wire interface for easy evaluation. Customers who wish to evaluate U1 and U2 using their own 2-wire interface must remove the parallel port cable from the board and attach the new 2-wire interface to the SCL, SDA, and GND pads located on the upper left-hand side of the MAX6955 EV kit board. The SCL, SDA, and GND pads are also useful for probing the 2-wire waveforms with a digital oscilloscope or logic analyzer.

Table 1. U1 Address Selection for Jumpers JU1 and JU2

JUMPER POSITION		DEVICE ADDRESS	
JU1	JU2	(Write)	(Read)
1-2	1-2	0xDE	0xDF
1-3	1-2	0xDA	0xDB
1-4	1-2	0xDC	0xDD
1-5	1-2	0xD8	0xD9
1-2	1-3	0xCE	0xCF
1-3*	1-3*	0xCA*	0xCB*
1-4	1-3	0xCC	0xCD
1-5	1-3	0xC8	0xC9
1-2	1-4	0xD6	0xD7
1-3	1-4	0xD2	0xD3
1-4	1-4	0xD4	0xD5
1-5	1-4	0xD0	0xD1
1-2	1-5	0xC6	0xC7
1-3	1-5	0xC2	0xC3
1-4	1-5	0xC4	0xC5
1-5	1-5	0xC0	0xC1

*Default for U1.

Table 2. U2 Address Selection for Jumpers JU3 and JU4

JUMPER POSITION		DEVICE ADDRESS	
JU3	JU4	(Write)	(Read)
1-2	1-2	0xDE	0xDF
1-3	1-2	0xDA	0xDB
1-4	1-2	0xDC	0xDD
1-5	1-2	0xD8	0xD9
1-2	1-3	0xCE	0xCF
1-3	1-3	0xCA	0xCB
1-4	1-3	0xCC	0xCD
1-5	1-3	0xC8	0xC9
1-2	1-4	0xD6	0xD7
1-3	1-4	0xD2	0xD3
1-4	1-4	0xD4	0xD5
1-5	1-4	0xD0	0xD1
1-2	1-5	0xC6	0xC7
1-3	1-5	0xC2	0xC3
1-4	1-5	0xC4	0xC5
1-5*	1-5*	0xC0*	0xC1*

*Default for U2.

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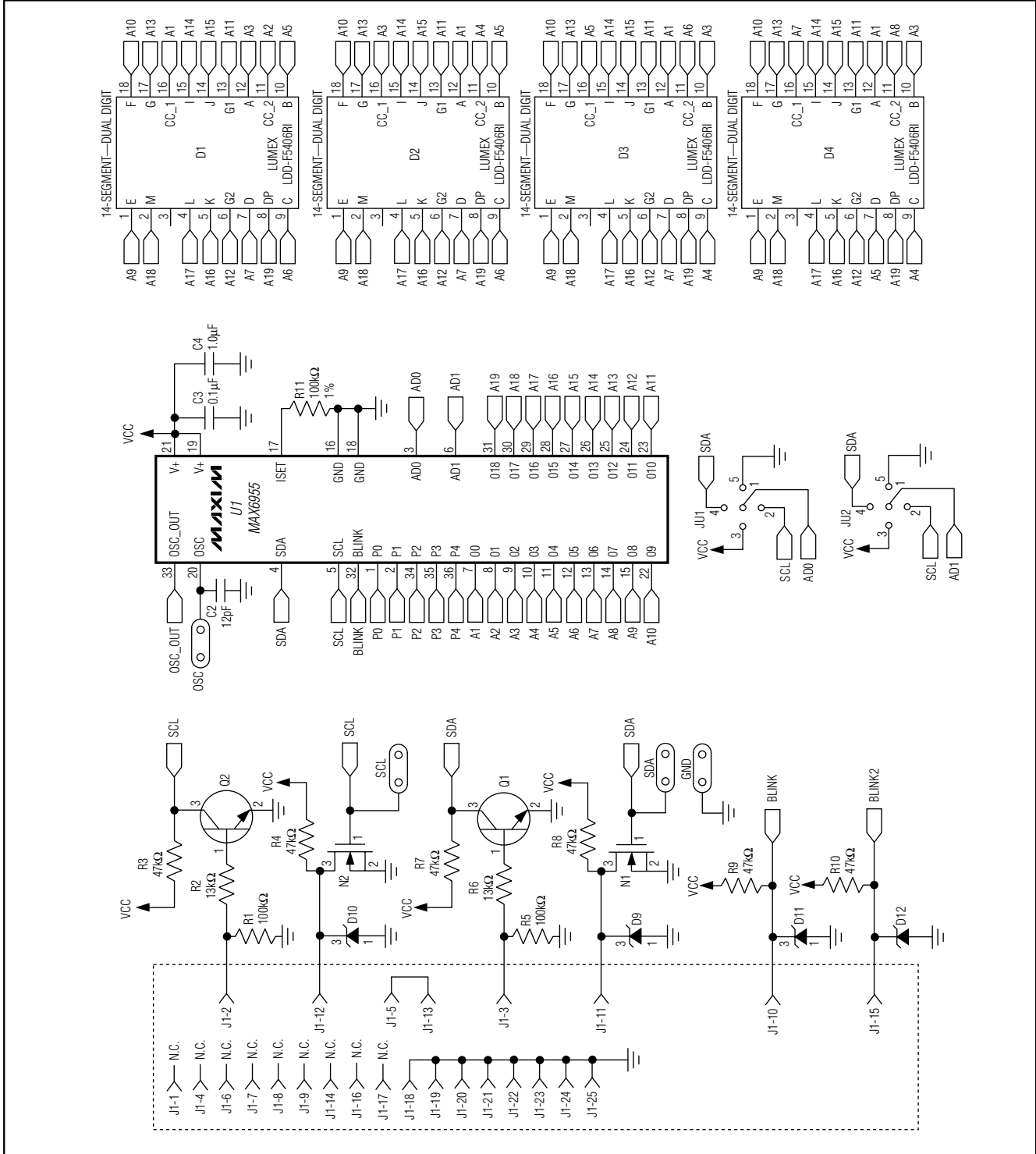


Figure 2. MAX6955 Schematic (Sheet 1 of 3)

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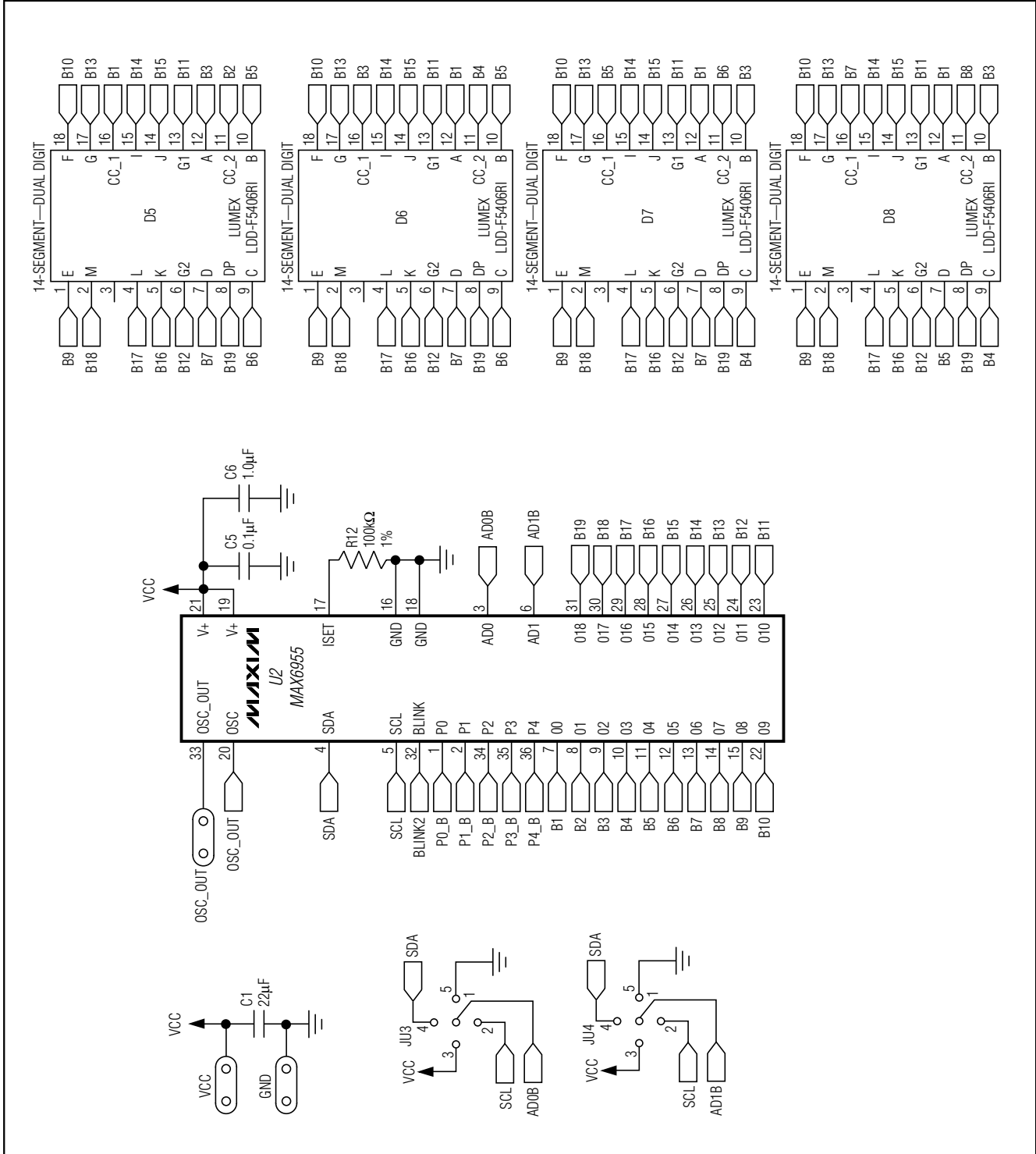


Figure 2. MAX6955 Schematic (Sheet 2 of 3)

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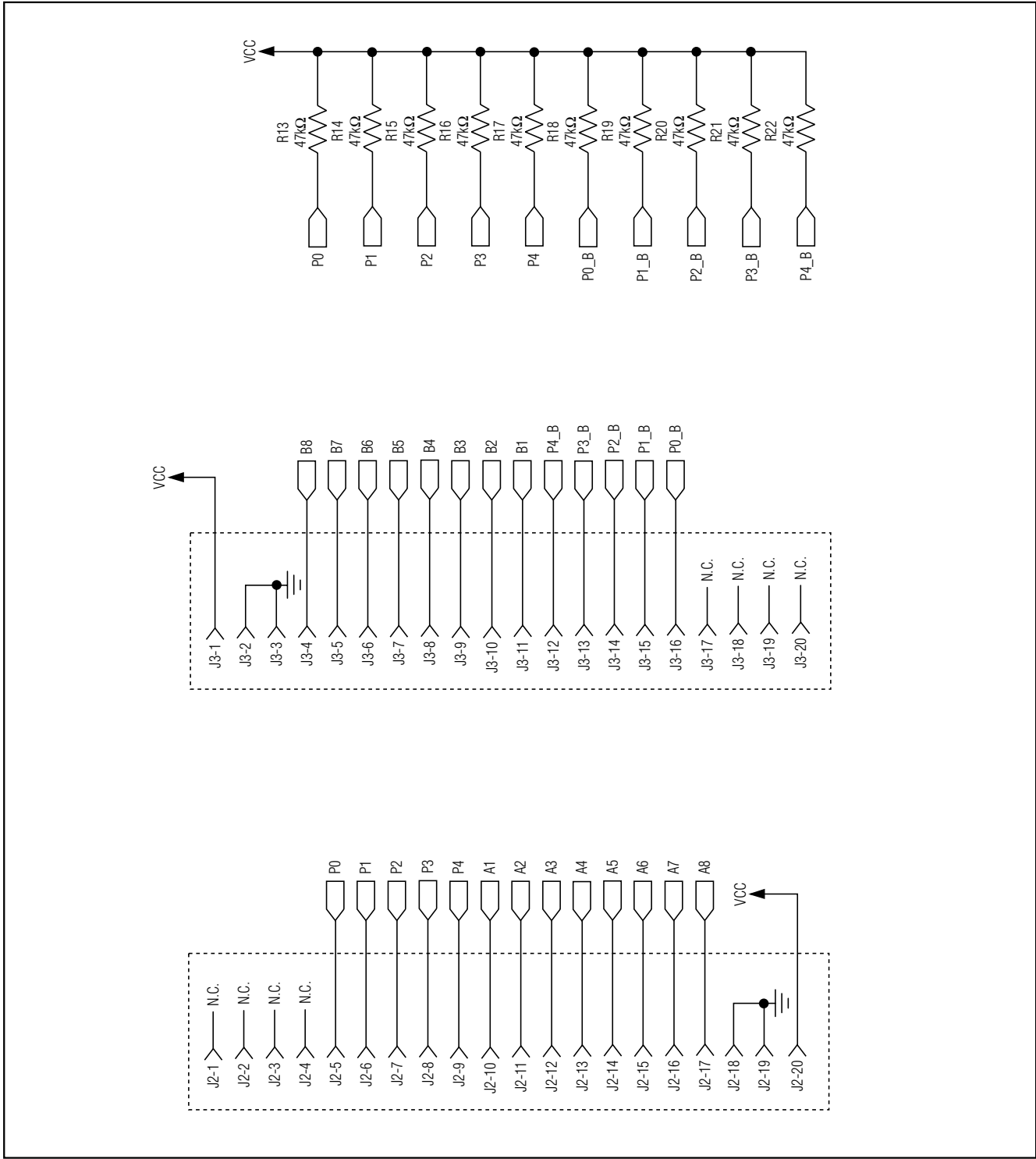


Figure 2. MAX6955 Schematic (Sheet 3 of 3)

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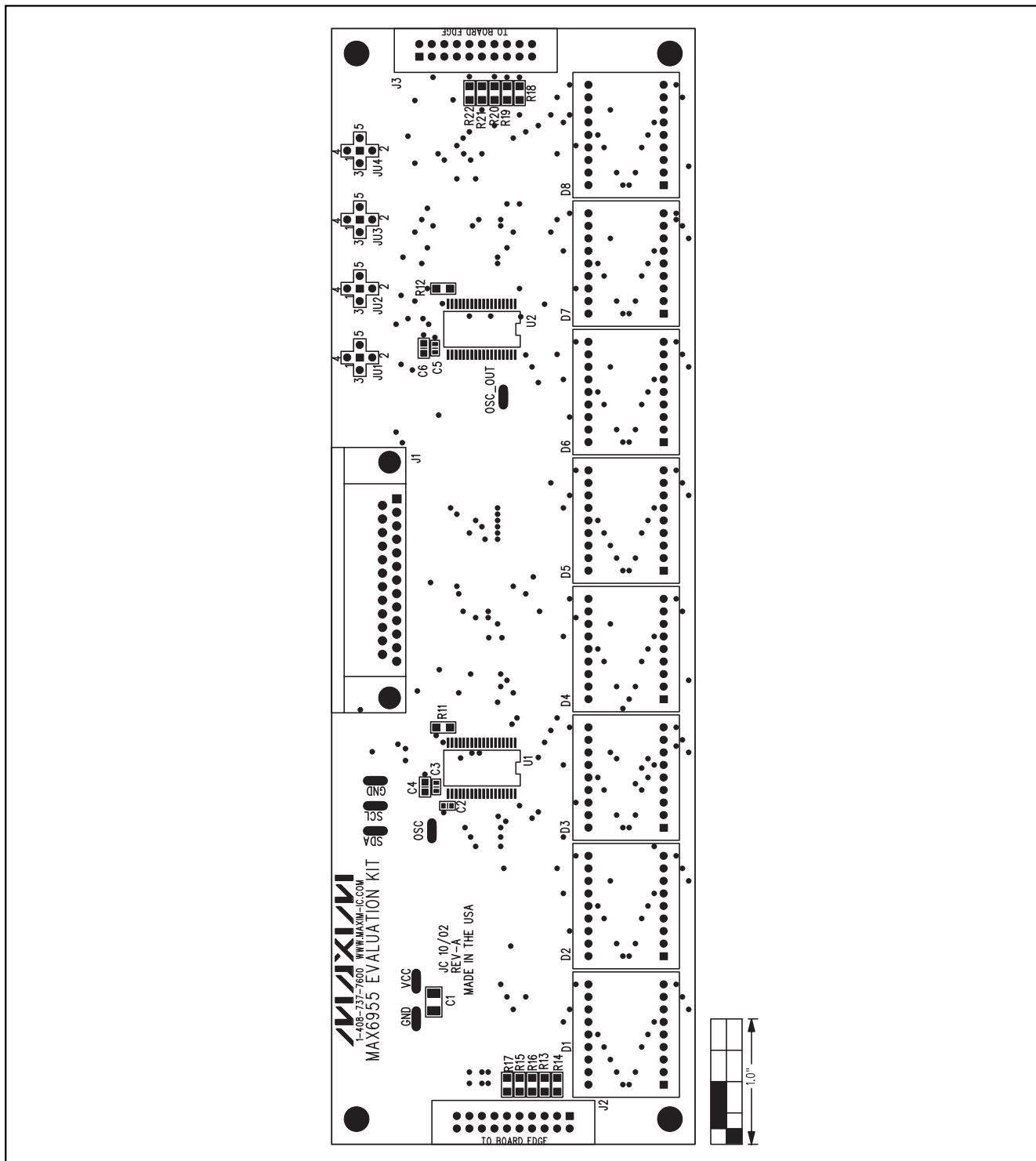


Figure 3. MAX6955 EV Kit Component Placement Guide—Component Side

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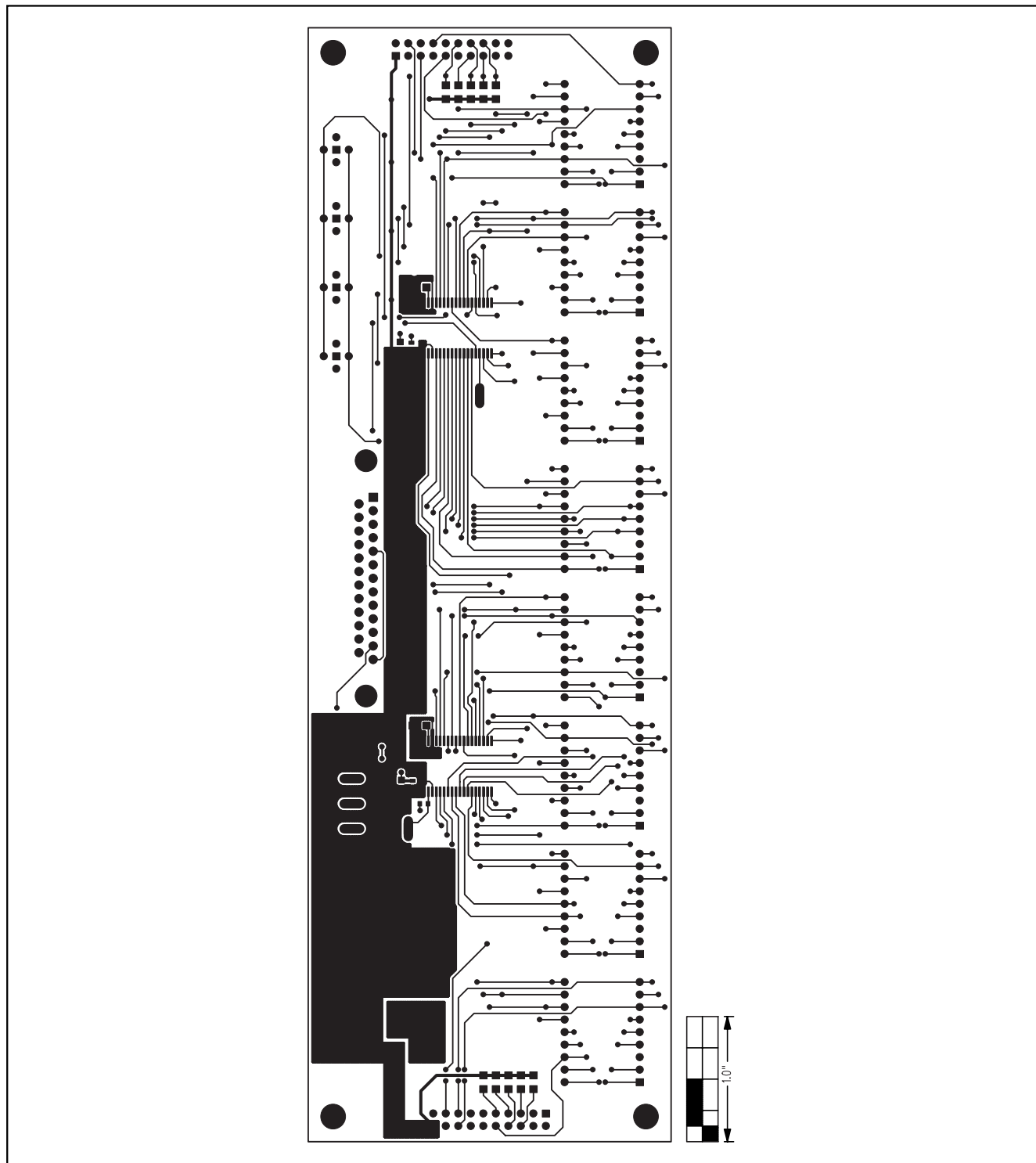


Figure 4. MAX6955 EV Kit PC Board Layout—Component Side

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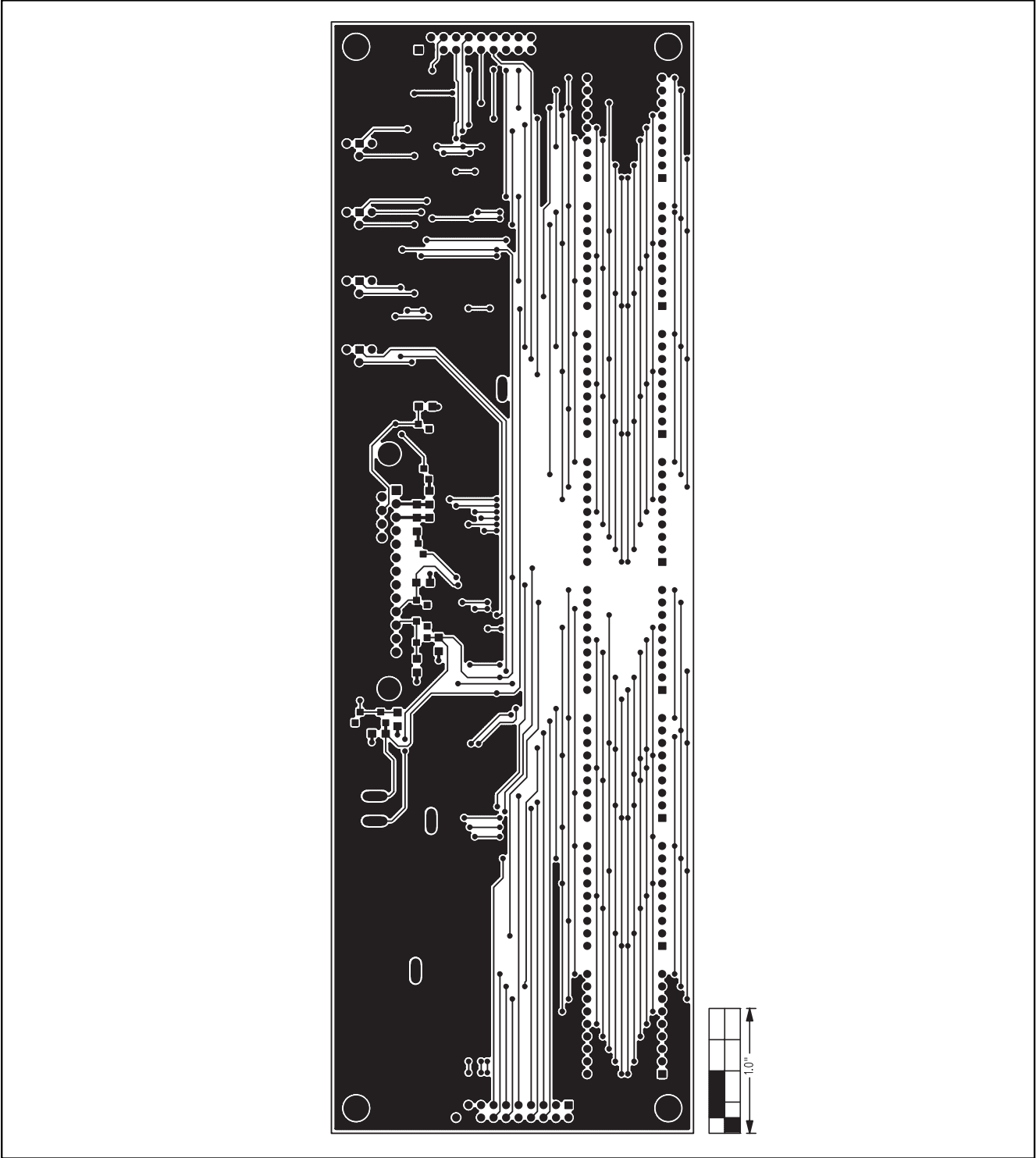


Figure 5. MAX6955 EV Kit PC Board Layout—Solder Side