



DS8113 EMV Evaluation Kit

General Description

The DS8113 evaluation kit (EV kit) is a proven platform to conveniently evaluate the capabilities of the DS8113 smart card interface chip. The EV kit includes a MAXQ2000 16-bit RISC microcontroller to control the smart card interface. One full-size socket is included to communicate with any 1.8V, 3V, or 5V IC card. An LCD screen can provide detailed feedback on program operation and aids in debugging applications.

EV Kit Contents

- ◆ DS8113 EV Kit Board with Processor, Smart Card Socket, and LCD Screen Installed
- ◆ JTAG Interface Board (In-Application Debugging)
- ◆ DS8113 EV Kit CD, Including EMV™ Library
- ◆ Rowley Crossworks Evaluation Compiler
- ◆ Serial Cable

Features

- ◆ Easily Develop Smart Card Applications Using EMV Library and MAXQ® 16-Bit RISC Microcontroller
- ◆ 2-Line LCD Screen for Graphical User Interaction
- ◆ USB Interface for Prototyping USB Card Reader Applications
- ◆ A Card Socket for Interfacing with Standard Chip Cards
- ◆ Card Interface Pins Brought Out to Headers for Customer Card Socket Control
- ◆ Pushbuttons for Reset, Interrupt, and Application Control
- ◆ Included Level-Shifted RS-232 Interface
- ◆ Included Board Schematics Provide a Convenient Reference Design

Ordering Information

PART	TYPE
DS8113-KIT	EV Kit

Component List

DESIGNATION	QTY	DESCRIPTION
CN1	1	USB receptacle (B type) 897-30-004-90-000000
C1, C6, C8, C14, C17, C18, C20, C21, C23– C27, C30, C31, C33, C34, C37, C38, C40, C43– C47, C56, C57	27	100nF capacitors C0402C104K4RACTU
C2, C3, C11, C12, C32, C35	6	18pF capacitors ECJ-0EC1H180J
C4, C5, C9	3	2.2µF capacitors ECJ-1VB1A225K
C7, C10, C48	3	1.0µF capacitors ECJ-0EB0J105M
C13, C52–C55	5	10nF capacitors C0402C103K4RACTU

DESIGNATION	QTY	DESCRIPTION
C15, C22, C51	3	4.7µF capacitors GRM219R61A475KE19D
C16, C19, C28, C29, C36, C58	6	10µF capacitors LMK212BJ106KD-T
C39, C49, C59, C60	4	1.0µF capacitors ECJ-2FB1C105K
C41, C50	2	100nF capacitors C0805C104K3RACTU
C42	1	10µF capacitor T491D106K025AT
DS1, D5	2	Green LEDs HSMG-C150
D1	1	TVS diode 1SMC5.0AT3G
D2	1	Blue LED HSMR-C150

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DESIGNATION	QTY	DESCRIPTION
D3	1	Orange LED HSMD-C150
D4	1	Red LED HSMS-C150
D6, D7	2	Diodes GS1A-TP
FB1	1	SMD chip ferrite bead, 2000 Ω Steward HZ1206C202R-00, HZ1206C202R-10
F1	1	1A surface-mount fuse Littlefuse 0459001.UR
JU1, JU5, JU7, JU9	4	2-pin NO jumpers 3M 929647-09-02-I
JU2, JU3, JU4, JU6, JU8	5	3-pin NO (T) jumpers 3M 929647-09-03-I
J1	1	2.5mm power jack with tapered PC pins CUI Inc. PJ-102B
J2	1	2x5 (JTAG) header 3M 929665-02-05-I
J3	1	DB-9 female header Tyco Electronics Amp 5745781-3
J4	1	0.100in, 10-position single-strip header 3M 929647-09-10-I
J5	1	EMV smart card connector Amphenol-Tuchel C702 10M008 2724 A
J6	1	0.100in, 8-position single-strip header 3M 929647-09-08-I
LS1, LS2	2	SPDT 2A 5VDC relays G6E-134P-L-ST-US-DC5
Q1, Q2	2	μ TrenchMOS™ extremely low-level FET NXP Semiconductors PMV31XN T/R
R1, R2, R3	3	270 Ω resistors CRCW0402270RFKED

DESIGNATION	QTY	DESCRIPTION
R4	1	0..10k Ω resistor Panasonic EVN-5CSX50B14
R5	1	150 Ω resistor CRCW0402150RFKED
R6	1	180 Ω resistor CRCW0402180RJNED
R7, R8	2	33.2 Ω resistors CRCW040233R2FKED
R9	1	2.2k Ω resistor CRCW04022K20FKED
R10	1	10k Ω resistor CRCW040210K0FKED
R11	1	249k Ω resistor CRCW0402249KFKED
R12, R14	2	0.33 Ω resistors ERJ-1TRQFR33U
R13	1	1.27M Ω resistor CRCW04021M27FKED
R15, R16	2	604k Ω resistors CRCW0805604KFKEA
R17	1	0 Ω resistor CRCW06030000Z0EA
SW1–SW4	4	Momentary tact switches TL3301AF160QG/TR
SW5	1	SPDT switch toggle, 0.4VA PC mount 200AWMSP1T1A1M2RE
TP1–TP5	5	Test points 5012
U1	1	LCD screen Lumex LCM-S02002DSF
U2	1	150mA, SOT23, low-dropout linear regulator with internal microproces- sor reset circuit (6 SOT23) Maxim MAX6349TPUT+
U3	1	USB peripheral controller with SPI interface (32 LQFP) Maxim MAX3420EECJ

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DESIGNATION	QTY	DESCRIPTION
U4	1	Low-power LCD microcontroller (68 QFN) Maxim MAXQ2000-RAX+
U5	1	500mA, low-dropout linear regulator in SOT23 (6 SOT23) Maxim MAX1818EUT33#G16
U6	1	300ksps/400ksps, single-supply, 4-channel, serial 12-bit ADC with internal reference (16 TSSOP) Maxim MAX1282BCUE+
U7	1	+2.35V to +5.5V, 1 μ A, 2Tx/2Rx RS-232 transceiver with \pm 15kV ESD-protected I/O and logic pins (20 TSSOP) Maxim MAX3381ECUP+
U8, U10	2	Low-cost, SOT23, micropower, high-side current-sense amplifier with voltage output (5 SOT23) Maxim MAX4372TEUK+
U9	1	High-voltage, low-power linear regulator for notebook computers (5 SOT23) Maxim MAX1616EUK+

DESIGNATION	QTY	DESCRIPTION
U11, U14	2	Micropower, single-supply, rail-to-rail precision differential amplifiers (8 μ MAX [®]) Maxim MAX4198EUA+
U12	1	Switched-capacitor voltage doubler (5 SOT23) Maxim MAX1683EUK+
U13, U16	2	Micropower, single-supply, 10V, rail-to-rail I/O pp amp (5 SOT23) Maxim MAX4162EUK+
U15	1	350mA, 16.5V input, low-dropout linear regulators (8 SO) Maxim MAX1658ESA+
U17	1	Smart card interface (QFN version only*) Maxim DS8113
Y1	1	16MHz crystal CS10-16.000MABJ-UT
Y2	1	12MHz crystal CS10-12.000MABJ-UT
Y3	1	32768Hz crystal FC-255 32.7680K-A3
Y4	1	Not populated

*U17 is based on the QFN pinout. Refer to the DS8113 IC data sheet for the SO/TSSOP pinout.

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Table 1. Jumper Settings

JUMPER	SETTING	DESCRIPTION
JU1	Installed	DS8113's VCC connected to smart card socket, C1 pin.
JU2	Installed: Connect pins 1 and 2	DS8113's PRES pin pulled high (3.3V) through 10k Ω resistor.
JU3	Installed: Connect pins 2 and 3	Smart card socket's S2 pin connected to ground.
JU4	Installed: Connect pins 2 and 3	Board's VDDA source connected to the DS8113's VDDA pin.
JU5	Not Installed	DS8113's V _{UP} pin is unused.
JU6	Installed: Connect pins 2 and 3	Board's 5V source selected as board's VDDA.
JU7	Installed	Board's VDDA source connected to the DS8113's VDDA pin.
JU8	Installed: Connect pins 2 and 3	Board's 3.3V source selected as the DS8113's VDD.
JU9	Installed	Board's VDD source connected to the DS8113's VDD pin.

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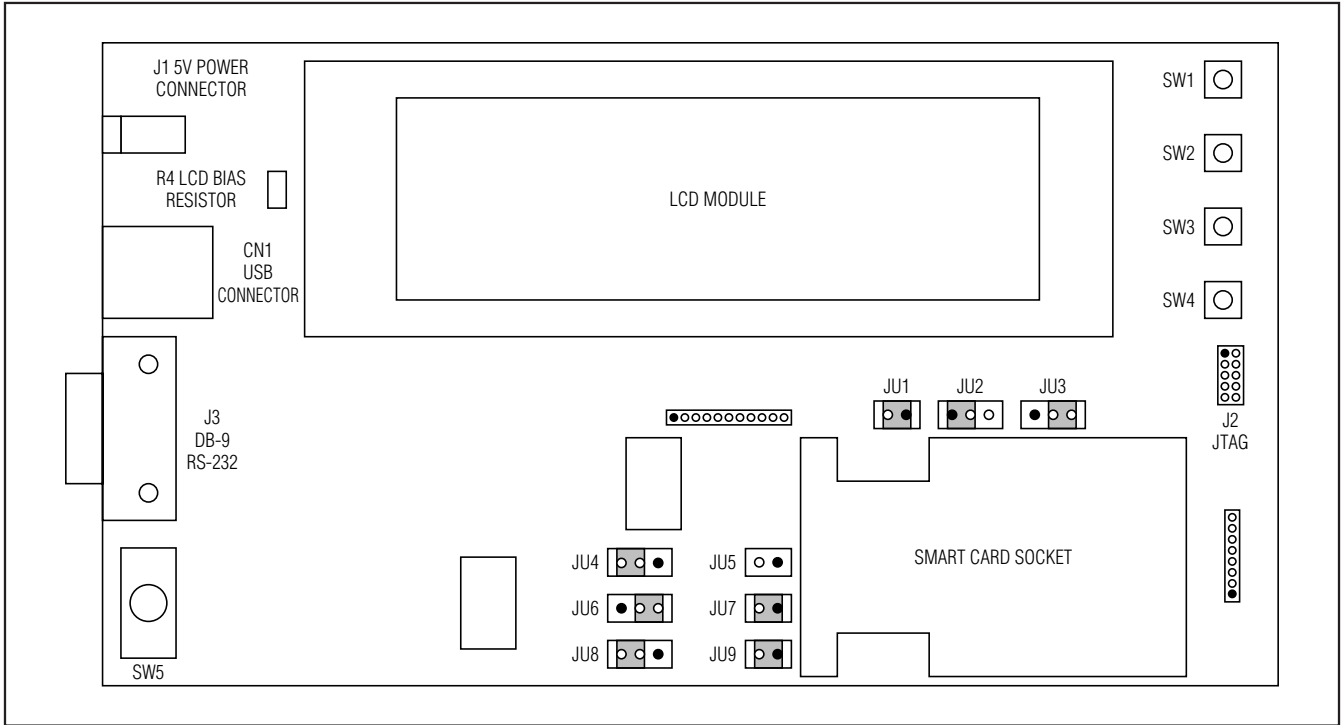


Figure 1. DS8113 EV Kit Default Jumper Setting

Detailed Description

This EV kit board must be used in conjunction with the following documents:

- DS8113 Data Sheet
- MAXQ2000 Data Sheet
- MAXQ Family User's Guide
- MAXQ Family User's Guide: MAXQ2000 Supplement

The EV kit should also be used with Application Note 4200: *Getting Started with the DS8113 Smart-Card Analog Interface Evaluation Kit*. This application note describes how to bring up and build simple applications for the DS8113 EV kit board.

The DS8113 EV kit board is fully defined in the schematics (Figure 3). However, a short description of

the major components and connectors of the boards follows.

LCD Module

A Lumex 2-line, 20-character LCD screen is included in the DS8113 EV kit board, part number LCM-S02002DSF. It is interfaced to the MAXQ2000's GPIO. The example software associated with Application Note 4200 contains software for writing characters to the LCD screen.

Smart Card Socket

The DS8113 EV kit includes one full-size smart card socket. The smart card socket allows developers to quickly prototype applications that require a single smart card interface. The EV kit also allows a custom card socket to be added through header pins.

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USB Interface

The DS8113 EV kit provides USB connectivity using the MAX3420E. The MAX3420E contains the digital logic and analog circuitry necessary to implement a full-speed USB peripheral compliant to the USB 2.0 specification, when controlled through the MAXQ2000's SPI port. This provides an ideal solution for applications such as a PC-based USB card reader.

Programming the DS8113 EV Kit

Refer to Application Note 4200 for details on loading a program into the DS8113 EV kit board. Microcontroller Tool Kit (MTK), or another serial loader program, is required to load a hex file into the MAXQ2000 microcontroller.

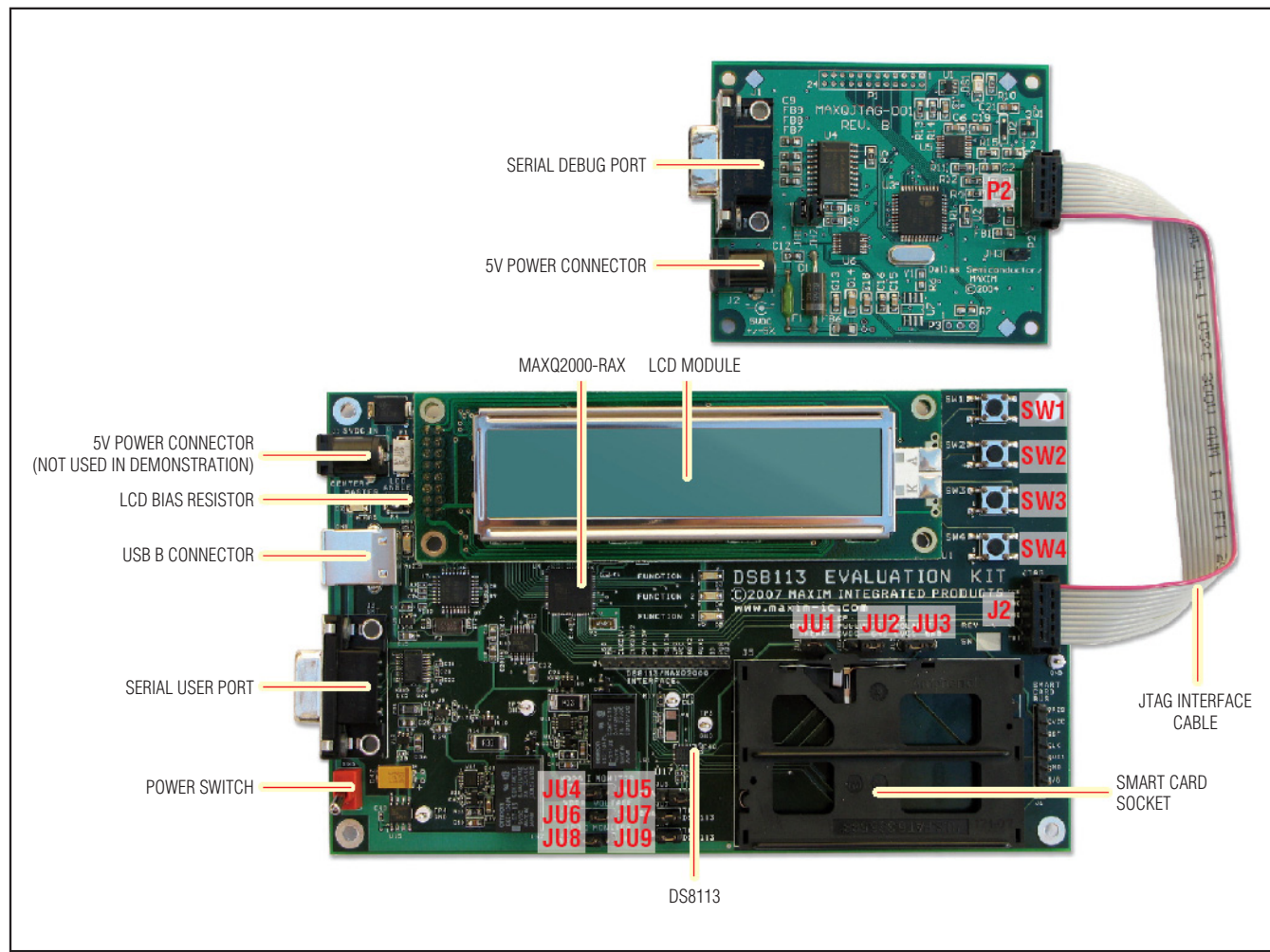


Figure 2. DS8113 EV Kit Board

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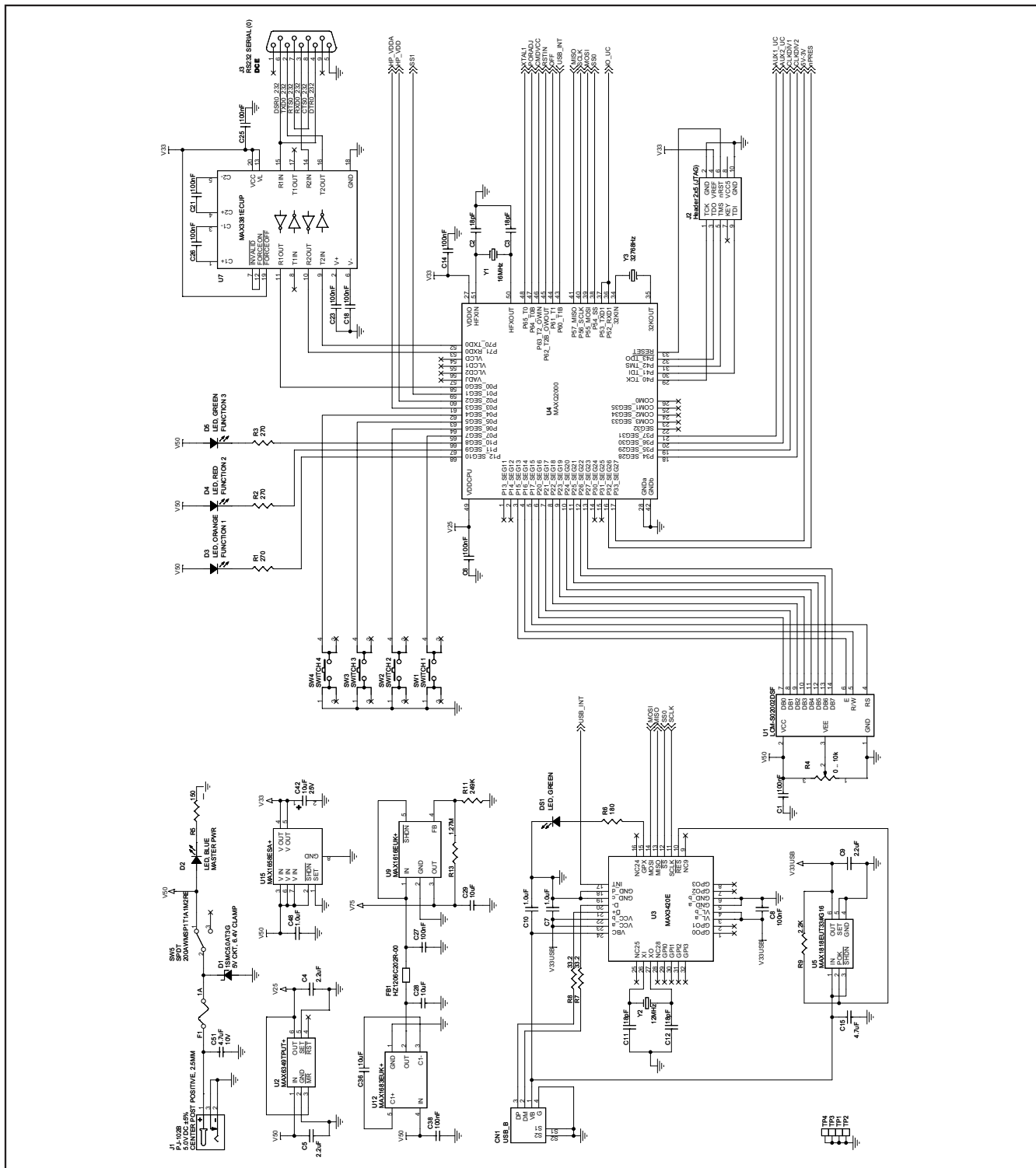
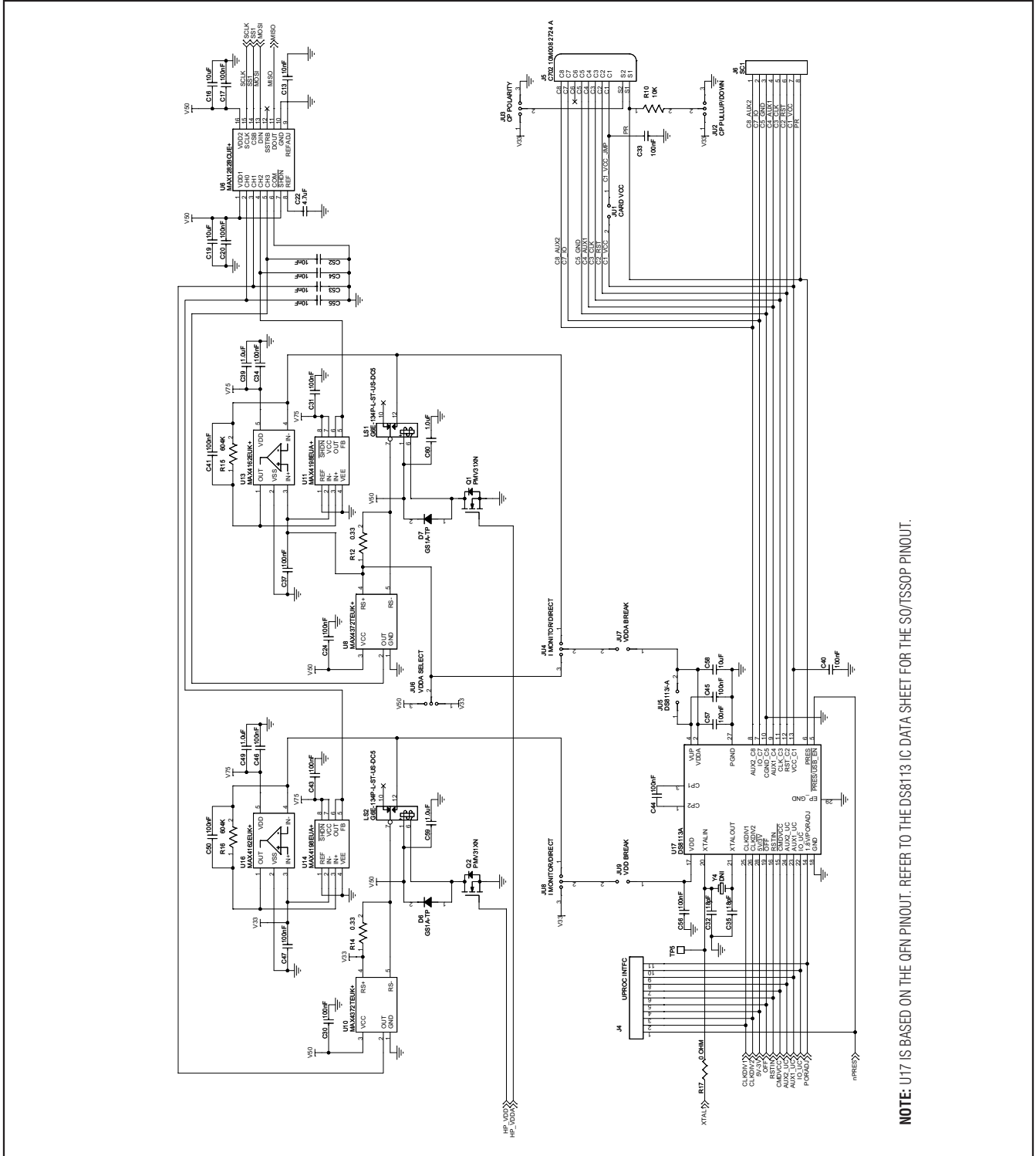


Figure 3a. DS8113 EV Kit Smart Card Schematics—MAXQ2000, Power, USB, Serial, JTAG (Sheet 1)

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NOTE: U17 IS BASED ON THE QFN PINOUT. REFER TO THE DS8113 IC DATA SHEET FOR THE SOT/TSSOP PINOUT.

Figure 3b. DS8113 EV Kit Smart Card Schematics—DS8113, ADC, Smart Card Socket (Sheet 2)

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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	10/08	Initial release.	—
1	3/10	Added a note to U17 in the <i>Component List</i> and Figure 3b referring customers to the SO/TSSOP pinout in the IC data sheet.	3, 7

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