

## GENERAL DESCRIPTION

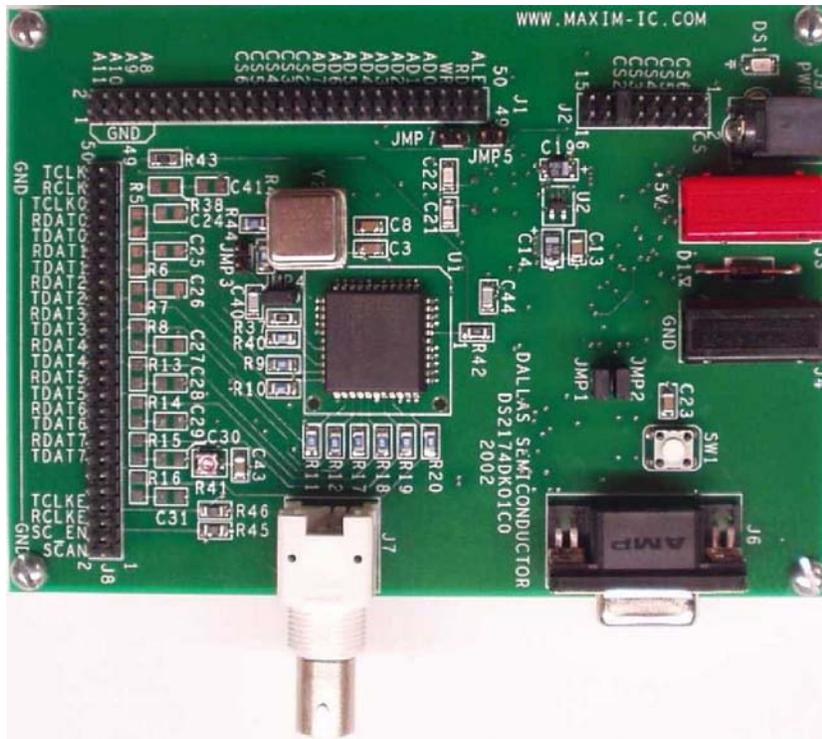
The DS2174DK is a fully integrated demonstration kit for the DS2174 enhanced bit error-rate tester (BERT). This demo kit contains all the necessary circuitry to evaluate the device in all modes of operation. The boards are complete with a DS2174, on-board microcontroller with RS-232 control, test points for all IO pins on the BERT, and an address/data header for connection to an external prototyping system.

## ORDERING INFORMATION

PART	DESCRIPTION
DS2174DK	BERT Design Kit

## FEATURES

- A Soldered DS2174 in the 44-Pin PLCC Package for Maximum Signal Integrity
- On-Board Selectable Oscillator for TCLK
- On-Board Selectable Analog Input for TCLK
- On-Board 8051 Microprocessor for Software Mode Access
- Selectable CS for the DS2174; Used for Either Multiboard Operation or System Level Development
- Signal Termination on all High-Speed Transmit and Receive Paths



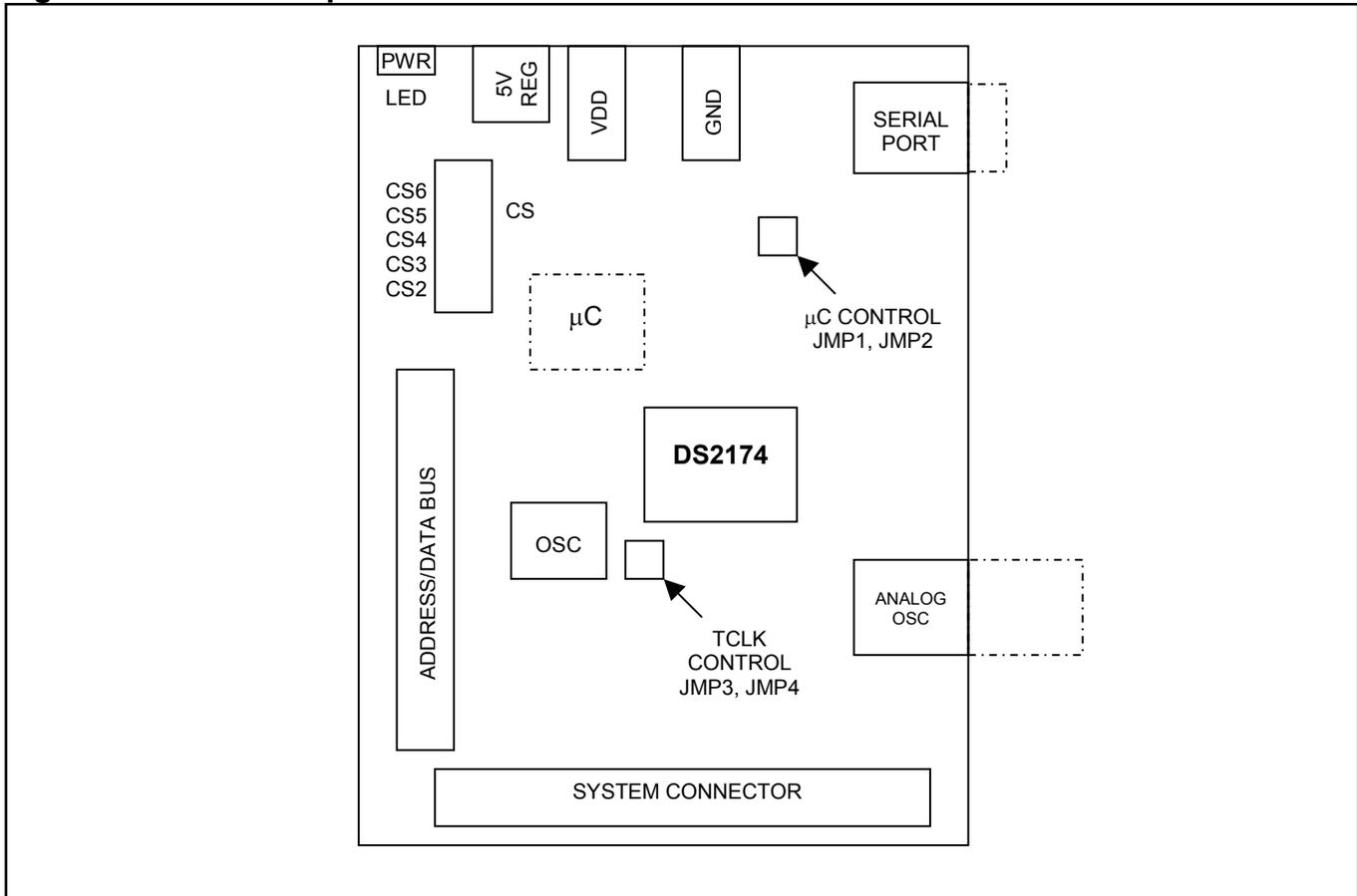
## COMPONENT LIST

DESIGNATION	QTY	DESCRIPTION	SUPPLIER	PART
C1, C2, C23	3	1 $\mu$ F 10%, 16V ceramic capacitors (1206)	Panasonic	ECJ-3YB1C105K
C3–C7, C13, C43, C45–C48	11	0.1 $\mu$ F 10%, 25V ceramic capacitors (1206)	Panasonic	ECJ-3VB1E104K
C8–C12	5	0.01 $\mu$ F 10%, 50V ceramic capacitors (1206)	Panasonic	ECU-V1H103KBM
C14, C16–C20	6	10 $\mu$ F 20%, 16V tantalum capacitors (B case)	Panasonic	ECS-T1CX106R
C15	1	68 $\mu$ F 20%, 16V tantalum capacitor (D case)	Panasonic	ECS-T1CD686R
C21, C22	2	22pF 10%, 100V ceramic capacitors (1206)	AVX	12061A220KAT2A
C24–C31, C41	9	Do not place ceramic capacitors (1206)	—	—
C32–C40, C44	10	56pF 5%, 50V tall case ceramic capacitors (1206)	Phycomp	1206CG560J9B200
C42	1	0.001 $\mu$ F 10%, 50V ceramic capacitor (1206)	Panasonic	ECU-V1H102KBM
D1	1	1A, 50V general-purpose silicon diode	Vishay (formerly General Semiconductor)	1N4001
DS1	1	LED, red, SMD	Panasonic	LN1251C
J1	1	50-pin connector, dual row	Samtec	SSW-125-01-T-D
J2	1	16-pin header, dual row vertical	Samtec	HDR-TSW-18-14-T-D
J5	1	3-pin header, receptacle jack, right angle	Samtec	RAPC712
J6	1	DB9 connector, short case, right angle	AMP	788750-2
J7	1	BNC 50 $\Omega$ PC board bulkhead jack, right angle	Amphenol	31-5431
J8	1	Socket strip, 50-pin header, dual row vertical	Samtec	SSW-125-01-T-D
JMP1–JMP5, JMP7	6	Jumpers, 2-pin headers (100 mil)	AMP	
R1	1	330 $\Omega$ 1%, 1/8W resistor (1206)	Panasonic	ERJ-8ENF3300V
R2, R3, R45, R46	4	10k $\Omega$ 1%, 1/8W resistors (1206)	Panasonic	ERJ-8ENF1002V
R4, R9–R12, R17–R20, R40, R44, R47	12	30.1 $\Omega$ 1%, 1/8W resistors (1206)	Panasonic	ERJ-8ENF30R1V
R5–R8, R13–R16, R38	9	Do not place resistors (1206)	—	—
R21–R24, R29–R32, R37, R39, R42	11	100 $\Omega$ 1%, 1/8W resistors (1206)	Panasonic	ERJ-8ENF1000V
R25–R28, R33–R36, R43	9	0 $\Omega$ 5%, 1/8W resistors (1206)	Panasonic	ERJ-8GEYJ0R00V
R41	1	10k $\Omega$ 0.05W, 15V variable 1-turn resistor	Panasonic	EVM-7JSX30B14
SW1	1	4-pin, single-pole, light-touch switch	Panasonic	EVQPAE04M
U1	1	DS2174 EBERT (44-Pin TQFP, 0 $^{\circ}$ C to +70 $^{\circ}$ C)	Dallas Semiconductor	DS2174
U2	1	300mA, 3.3V, 5-pin SOT23 voltage regulator	Maxim	MAX8887EZK33
U3, U7, U8	3	Latch octal D-type with 5V inputs, 20-pin TSSOP	Texas Instruments	SN74LCX373PWR
U4	1	Dual RS-232 transmitter/receiver (150-mil 16-pin SO)	Dallas Semiconductor	DS232AR
U5	1	DS87C520-ECL high-speed microcontroller	Dallas Semiconductor	DS87C520-ECL
U6	1	3-to-8 line decoder (16-pin SO)	Toshiba	TC74HC138AFN
U9	1	Quad line receiver (16-pin SO)	Maxim	MAX9126ESE
Y1	1	11.0592MHz low-profile crystal	Dove Electronics	EC1-S-11.0592M
Y2	1	Half-size socket (8-pin STD DIP)	Aries Electronics	1108800

## BOARD FLOORPLAN

Figure 1 shows the board layout for the DS2174DK. The DS2174 PLCC device is in the center of the board. All the power connectors can be found on the top of the design kit. This includes the two banana jack connectors and the three terminal connectors for a 5V DC power supply. The RS-232 serial connector and the BNC connector for the TCLK analog input are along the right side of the board. The chip-select header and address/data bus are on the left-hand side. The system connector with all the telecom I/O signals is at the bottom of the board. The microcontroller is on the bottom side of the board, slightly above the DS2174. Please notice in Figure 1 the dashed outline indicating the location of assembly. Please look in the general locations on the board when this document references specific items on the DS2174DK.

**Figure 1. Board Floorplan**



## SYSTEM CONNECTOR

A 50-pin system connector (J8) at the bottom of the board gives access to the following DS2174 signals: TCLK, RCLK, TCLKO, RDAT0–RDAT7, TDAT0–TDAT7, TCLK, RCLK, TCLKO, RDATX to RDATX, the system connector can also be used to implement an external loopback for part development and verification. With this feature, you can quickly use this design kit as a working prototype for your system. [Table 1](#) shows a representation of the system connector. Please keep in mind signal names in relationship to the pin number on the connector. Due to the termination placement on the telecom signals, the board's silkscreen was moved below the connector.

**Table 1. System Connector (J8)**

PIN	NAME		PIN
50	GND	TCLK	49
48	GND	RCLK	47
46	GND	TCLKO	45
44	GND	RDAT0	43
42	GND	TDAT0	41
40	GND	RDAT1	39
38	GND	TDAT1	37
36	GND	RDAT2	35
34	GND	TDAT2	33
32	GND	RDAT3	31
30	GND	TDAT3	29
28	GND	RDAT4	27
26	GND	TDAT4	25
24	GND	RDAT5	23
22	GND	TDAT5	21
20	GND	RDAT6	19
18	GND	TDAT6	17
16	GND	RDAT7	15
14	GND	TDAT7	13
12	GND	—	11
10	GND	—	9
8	GND	TCLK	7
6	GND	RCLK	5
4	GND	SC_EN	3
2	GND	SCAN	1

## DS2174DK MEMORY MAP

The DS2174DK can be configured to suit a variety of needs. For example, this demo kit can be used as a stand-alone design kit or it may be configured together with two DS2174DKs. The board can also be used with another system by using the on-board microcontroller or disabling the microcontroller and using the address/data bus header that is provided. [Table 2](#) shows how you can determine the base memory location for the DS2174 on the board.

**Table 2. Pin Definitions of Chip Select Header (J2)**

PIN	NAME		PIN	MEMORY ADDRESS WHEN JUMPER IS IN PLACE
J2.1	—	—	J2.2	Not Used
J2.3	CS6	CS	J2.4	6000h to 6FFFh
J2.5	CS5	CS	J2.6	5000h to 5FFFh
J2.7	CS4	CS	J2.8	4000h to 4FFFh
J2.9	CS3	CS	J2.10	3000h to 3FFFh
J2.11	CS2	CS	J2.12	00h to 2FFFh
J2.13	—	—	J2.14	Not Used
J2.15	—	—	J2.16	Not Used

## DS2174DK TCLK SELECTION

The DS2174DK provides three separate sources for TCLK: an on-board crystal oscillator, analog input, or TCLK from the system header. [Table 3](#) shows the different sources for TCLK and how to configure the DS2174DK.

**Table 3. TCLK Selection**

TCLK SOURCE	JMP3	JMP4	FUNCTION
OSC (Y2)	Open	Closed	RCLK can be wired to TCLK or TCLKO on the system connector
Analog Input	Closed	Open	RCLK can be wired to TCLK or TCLKO on the system connector
TCLK	Open	Open	RCLK can be wired to TCLKO or driven on the system connector

## POWER-SUPPLY CONNECTORS

Connect a 5.0V power supply across the red ( $V_{DD}$ ) and black (GND) banana jacks. The red PWR LED indicates power is applied to the board. A voltage regulator then drops the supply to 3.3V, which is supplied to the DS2174. If you want to bring 5.0V and 3.0V to the address/data bus header, the JMP5 and JMP7 connectors should be closed.

## MICROCONTROLLER AND SERIAL CONNECTOR

The DS2174DK has an on-board 8051 microcontroller with factory-installed firmware loaded in the microcontroller's EPROM. This firmware translates memory access requests from the RS-232 serial port (57.6kB) to the address/data bus. Dallas Semiconductor has created a software application called ChipView that allows easy read-write access for this device. Download the application from our website, [www.maxim-ic.com/telecom](http://www.maxim-ic.com/telecom).

Close JMP1 and JMP2 to enable the on-board microcontroller. If you are using an external controller to communicate with the DS2174, JMP1 and JMP2 must remain open to tri-state the address/data bus.

If desired, the user can access the memory location on the board through any serial terminal program. All the write and read commands are distinguished with an "X" followed by the memory location. Depending on if it is a write or a read, the user provides data to be written to the memory location or expects data from the device.

Example: write to address 0020h the value FFh  
\$X20 = FF

Example: Read from address 0020h  
\$X20  
FF

Example: To read or write a range of addresses, enter X followed by range, separated by comma.  
\$X20,30 = 00

## QUICK SETUP (REGISTER VIEW)

- Make sure JMP1, JMP2, JMP4 are closed.
- Make sure there is a crystal oscillator in the Y2 socket.
- Open JMP3.
- Jumper RCLK with TCLKO.
- Jumper RDAT0 with TDAT0.
- Jumper CS2 with CS on J2.
- Power the board with 5V.
- Connect the DS2174DK to a PC with a serial port cable.
- Load ChipView.
- The program offers a choice among Demo Mode, Register View, and Terminal Mode. Select Register View.
- The program requests a definition file, and then select DS2174.DEF.
- The Register View screen appears, showing the register names, acronyms, and values.
- Predefined register settings for several functions are available as initialization files.
- INI files are loaded by selecting the menu File \_ Reg Ini File \_ Load Ini File.
- Load the INI file DS2174\_LOOPBACK.ini.
- After loading the INI, the DS2174 is ready to transmit the pattern received. Other patterns can be programmed. Please refer to the DS2174 data sheet ([www.maxim-ic.com/DS2174](http://www.maxim-ic.com/DS2174)) for all questions pertaining to DS2174 functionality.

## DS2174 INFORMATION

For more information about the DS2174, please consult the DS2174 data sheet, available on our website at [www.maxim-ic.com/DS2174](http://www.maxim-ic.com/DS2174).

## TECHNICAL SUPPORT

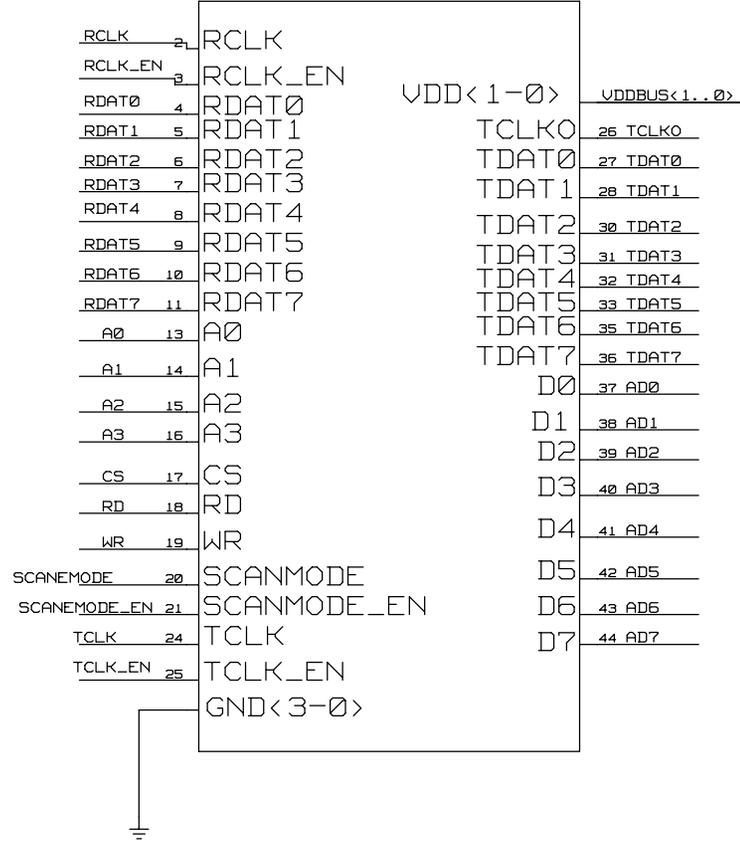
For technical support, please email your questions to [telecom.support@dalsemi.com](mailto:telecom.support@dalsemi.com).

## SCHEMATICS

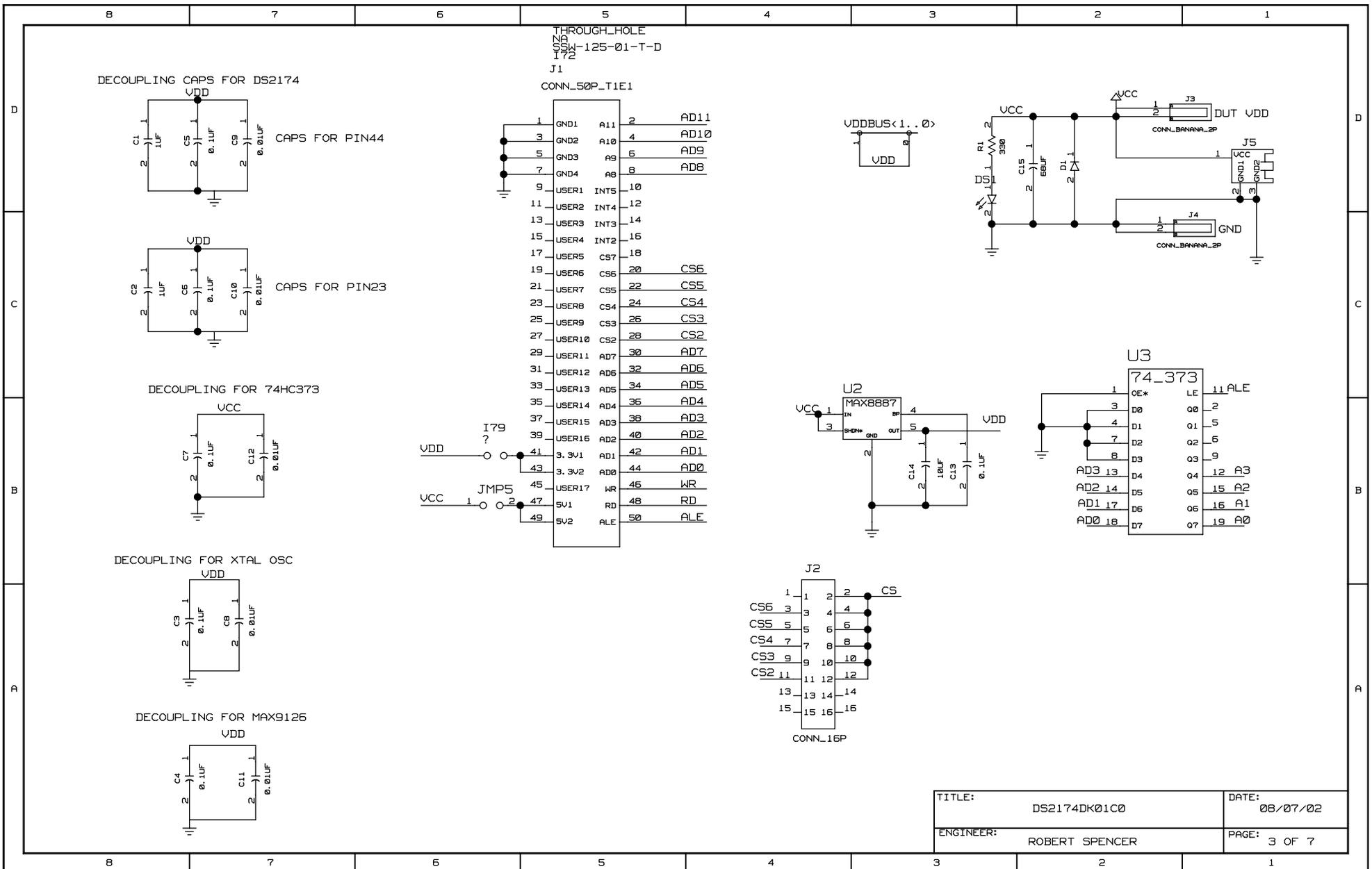
The DS2174DK schematics are featured in the following 6 pages.

THE COMPONENT VALUE OF DNP=DO NOT POPULATE

# U1 DS2174



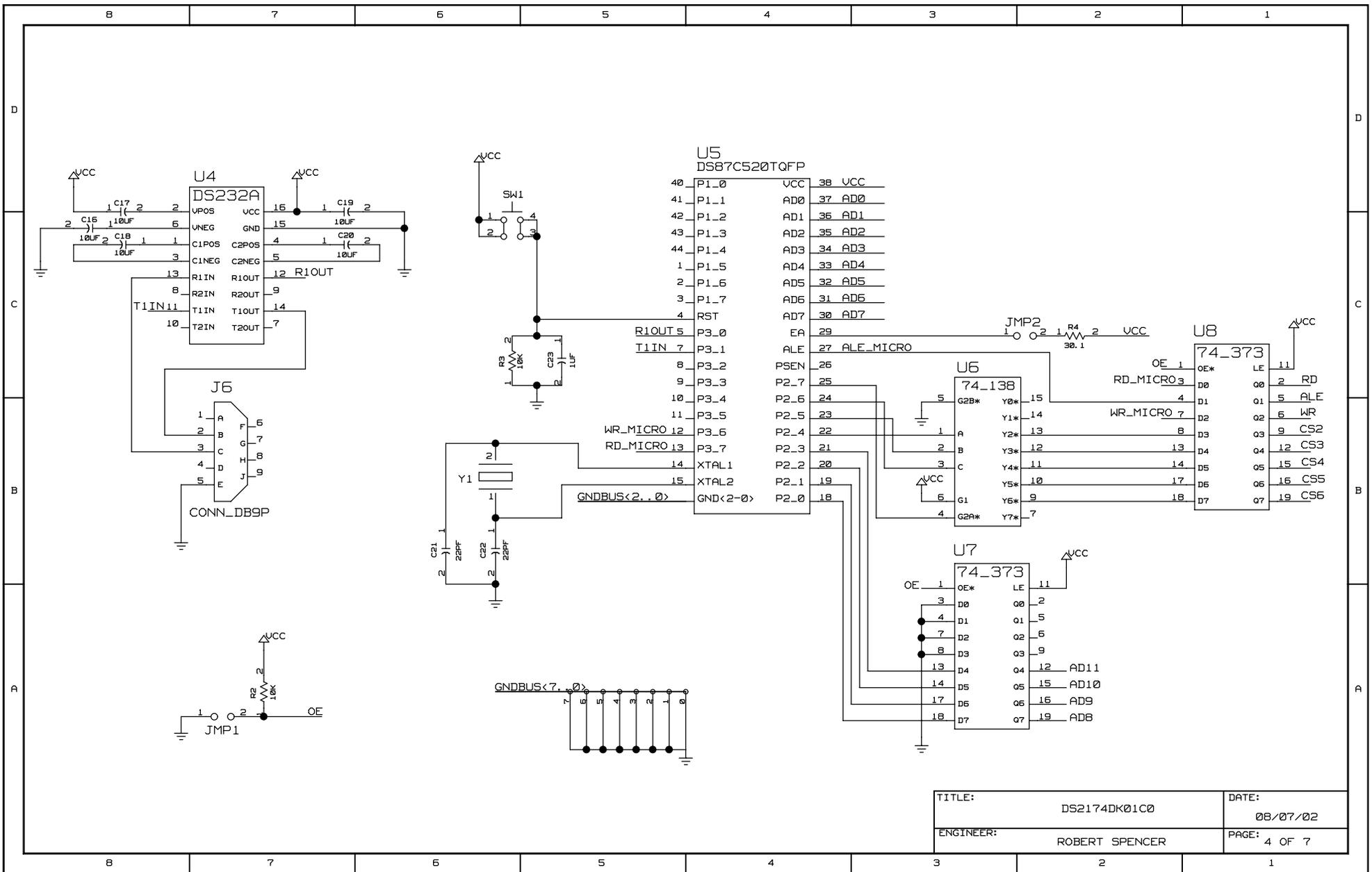
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THROUGH-HOLE  
 NSN-125-01-T-D  
 172  
 J1  
 CONN\_50P\_T1E1

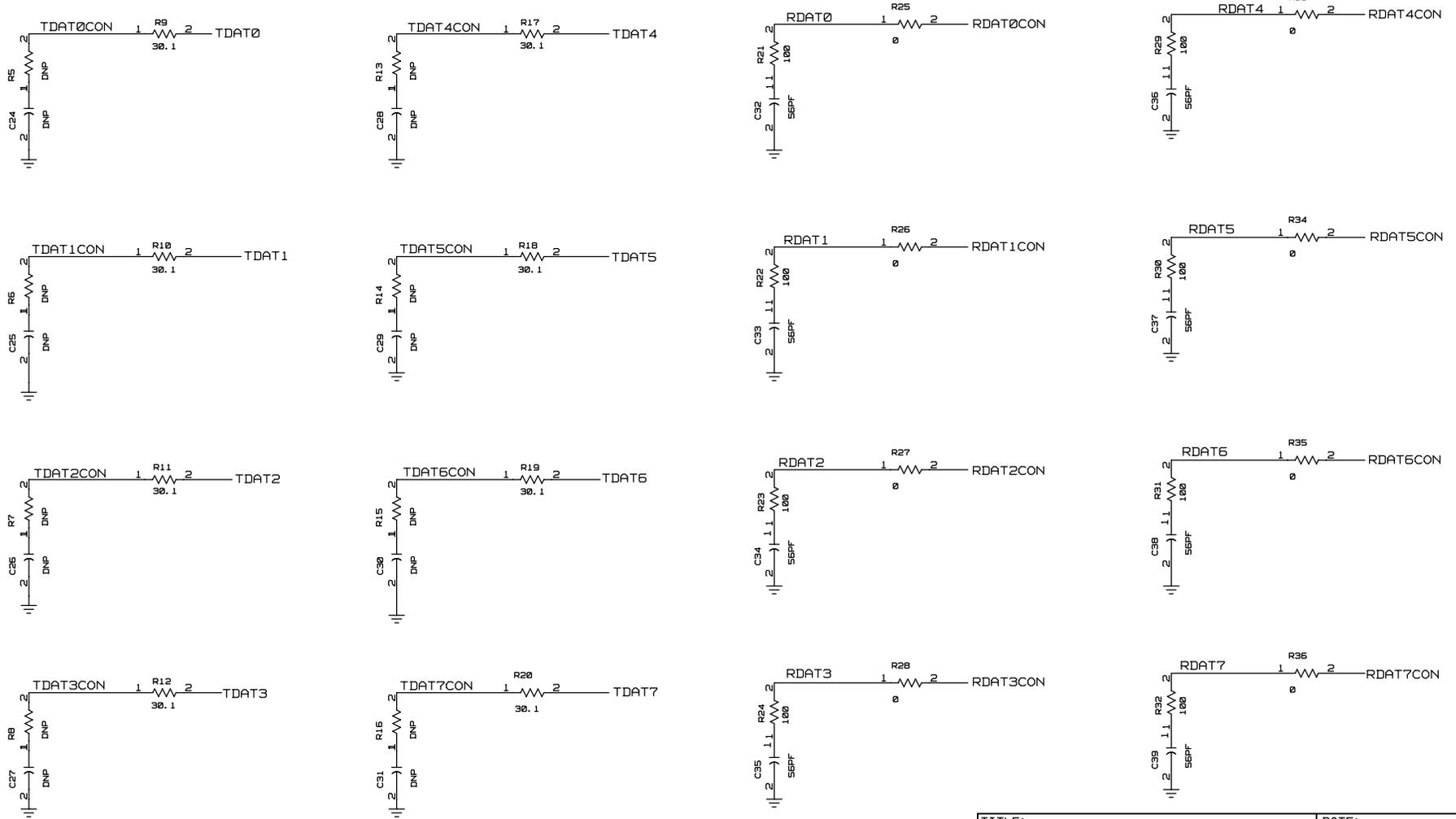
1	GND1	A11	2	AD11
3	GND2	A10	4	AD10
5	GND3	A9	5	AD9
7	GND4	A8	6	AD8
9	USER1	INT5	10	
11	USER2	INT4	12	
13	USER3	INT3	14	
15	USER4	INT2	16	
17	USER5	CS7	18	
19	USER6	CS6	20	CS6
21	USER7	CS5	22	CS5
23	USER8	CS4	24	CS4
25	USER9	CS3	26	CS3
27	USER10	CS2	28	CS2
29	USER11	AD7	30	AD7
31	USER12	AD6	32	AD6
33	USER13	AD5	34	AD5
35	USER14	AD4	36	AD4
37	USER15	AD3	38	AD3
39	USER16	AD2	40	AD2
41	3.3V1	AD1	42	AD1
43	3.3V2	AD0	44	AD0
45	USER17	WR	46	WR
47	SV1	RD	48	RD
49	SV2	ALE	50	ALE

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# TERMINATION



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	8	7	6	5	4	3	2	1									
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