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## GENERAL DESCRIPTION

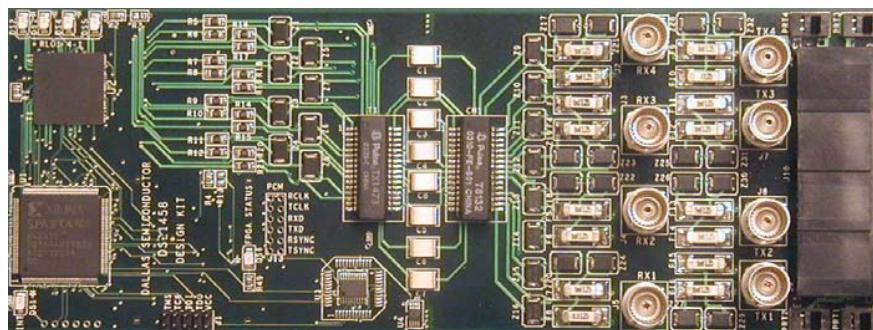
The DS21458DK is an easy-to-use evaluation board for the DS21458 quad T1/E1/J1 transceiver. The DS21458DK is intended to be used as a daughter card with the DK101 motherboard or the DK2000 motherboard. The DS21458DK comes complete with a DS21458 quad SCT, transformers, termination resistors, configuration switches, line-protection circuitry, network connectors, and motherboard connectors. The DK101/DK2000 motherboard and Dallas' ChipView software give point-and-click access to configuration and status registers from a Windows®-based PC. On-board LEDs indicate receive loss-of-signal and interrupt status. An on-board FPGA contains mux logic to connect framer ports to one another or to the DK2000 in a variety of configurations.

Each DS21458DK is shipped with a free DK101 motherboard. For complex applications, the DK2000 high-performance demo kit motherboard can be purchased separately.

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## DESIGN KIT CONTENTS

DS21458DK Design Kit Daughter Card  
 DK101 Low-Cost Motherboard  
 CD ROM  
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 DS21458 Data Sheet



# DS21458DK

## Quad T1/E1/J1 Transceiver

### Design Kit Daughter Card

## FEATURES

- Demonstrates Key Functions of DS21458 Quad T1/E1/J1 Transceiver
- Includes DS21458 Quad LIU, Transformers, BNC and RJ45 Network Connectors, and Termination Passives
- Compatible with DK101 and DK2000 Demo Kit Motherboards
- DK101/DK2000 and ChipView Software Provide Point-and-Click Access to the DS21458 Register Set
- All Equipment-Side Framer Pins are Easily Accessible for External Data Source/Sink
- Memory-Mapped FPGA Provides Flexible Clock/Data/Sync Connections Among Framer Ports and DK2000 Motherboard
- LEDs for Loss-of-Signal and Interrupt Status
- Easy-to-Read Silk Screen Labels Identify the Signals Associated with all Connectors, Jumpers, and LEDs
- Network Interface Protection for Overvoltage and Overcurrent Events

## ORDERING INFORMATION

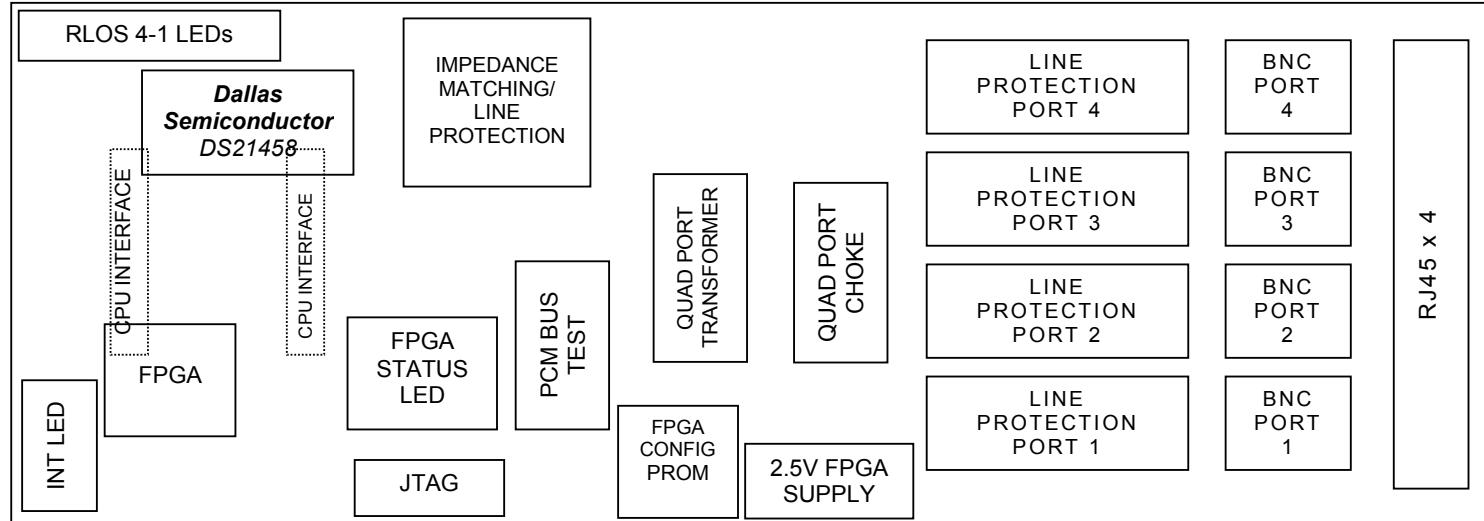
PART	DESCRIPTION
DS21458DK	DS21458 Design Kit Daughter Card (with included DK101 Motherboard)

DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card

**COMPONENT LIST**

DESIGNATION	QTY	DESCRIPTION	SUPPLIER	PART
C1–C8	8	0.22 $\mu$ F, 50V ceramic capacitors	Panasonic	PCF1152CT-ND
C9, C10, C12, C18, C22–C33, C35, C38–C43	23	0.1 $\mu$ F 10%, 16V ceramic capacitors (0603)	Phycomp	06032R104K7B20D
C11, C13–C15	4	0.1 $\mu$ F 10%, 25V ceramic capacitors (1206)	Panasonic	ECJ-3VB1E104K
C16, C17, C19–C21, C34, C36, C45, C46	9	1 $\mu$ F 10%, 16V ceramic capacitors (1206)	Panasonic	ECJ-3YB1C105K
C37, C44	2	10 $\mu$ F 20%, 10V ceramic capacitors (1206)	Panasonic	ECJ-3YB1A106M
CH1	1	Quad-port choke	Pulse Engineering	T8132
DS1	1	LED, red, SMD	Panasonic	LN1251C
DS2–DS6	5	LED, green, SMD	Panasonic	LN1351C
F1–F16	16	1.25A, 250V fuses, SMT	Teccor	F1250T
J1	1	10-pin connectors, dual row, vertical	Digi-Key	S2012-05-ND
J2–J9	8	5-pin BNC connectors, vertical	Cambridge	CP-BNCPC-004
J10	1	8-pin, 4-port jack Right-angle RJ45	Molex	43223-8140
J11, J12	2	50-pin sockets, SMD, dual row, vertical	Samtec	TFM-125-02-S-D-LC
J13	1	12-pin connector, dual row, vertical Not populated	Digi-Key	S2012-06-ND
J14	1	1Mbit flash-based configuration memory	Xilinx	XCF01SV020C
PRT1–PRT4	4	6-pin through-hole slide switches DPDT	Tyco	SSA22
R1, R2, R4, R26, R39, R41, R45	7	10k $\Omega$ 5%, 1/10W resistors (0805)	Panasonic	ERJ-6GEYJ103V
R3, R27	2	1.0k $\Omega$ 5%, 1/10W resistors (0805)	Panasonic	ERJ-6GEYJ102V
R5–R12, R14–R21, R48	17	0 $\Omega$ 5%, 1/8W resistors (1206)	Panasonic	ERJ-8GEYJ0R00V
R13, R47	2	Not populated	Panasonic	Not populated
R22–R25	4	51.1 $\Omega$ 5%, 1/10W resistors (0805)	Panasonic	ERJ-6GEY51R1V
R29–R36	8	61.9 $\Omega$ 1%, 1/8W resistors (1206)	Panasonic	ERJ-8ENF61R9V
R40, R42–R44, R46, R49	6	330 $\Omega$ 5%, 1/10W MF resistors (0805)	Panasonic	ERA-6GEY331V
T1	1	SMT 32-pin octal T1/E1 transformer, transmit/receive, 1:2	Pulse Engineering	TX1473
U1	1	2.5V FPGA Spartan (Xilinx) 144-pin TQFP	Xilinx	XC2S50-5TQ144C
U2	1	3.3V T1/E1/J1 quad transceiver 0°C to +70°C, 256-pin BGA	Dallas Semiconductor	DS21458
U3	1	1M PROM for FPGA 44-pin TQFP	Xilinx	Not populated
U4	1	8-pin $\mu$ MAX, SO 2.5V or Adj	Maxim	MAX1792EUA25
Z1–Z8	8	50A, 6V Sidactor DO214 SMD	Teccor	P0080SAMC
Z9–Z16	8	500A, 25V Sidactor DO214 SMD	Teccor	P0300SCMC
Z17–Z32	16	500A, 170V Sidactor DO214 SMD	Teccor	P1800SCMC

## BOARD FLOORPLAN



## BASIC CONFIGURATION

This design kit relies upon several supporting files, which are available for downloading on our website at [www.maxim-ic.com/telecom](http://www.maxim-ic.com/telecom). See the DS21458DK QuickView data sheet for these files.

### Hardware Configuration

#### Using the DK101 Processor Board:

- Connect the daughter card to the DK101 processor board.
- Supply 3.3V to the banana-plug receptacles marked GND and VCC\_3.3V. (The external 5V connector is unused. Additionally, the TIM 5V supply headers are unused.)
- All processor board DIP switch settings should be in the ON position with exception of the flash programming switch, which should be OFF.
- From the Programs menu, launch the host application named ChipView.EXE. Run the ChipView application. If the default installation options were used, click the Start button on the Windows toolbar and select Programs → ChipView → ChipView.

#### Using the DK2000 Processor Board:

- Connect the daughter card to the DK2000 processor board.
- Connect J1 to the power supply that is delivered with the kit. Alternately, a PC power supply may be connected to connector J2.
- From the Programs menu, launch the host application named ChipView.EXE. Run the ChipView application. If the default installation options were used, click the Start button on the Windows toolbar and select Programs → ChipView → ChipView.

### General

- Upon power-up, the RLOS LEDs (green) will not be lit, the INT LED (red) will not be lit, but the FPGA Status LED (green) will be lit.
- When operating in E1 mode, slide SW1–SW4 to E1 Mode (grounding the BNC shell). When operating in T1 mode, slide SW1–SW4 to T1 Mode.

### Miscellaneous

- Clock frequencies and certain pin bias levels are provided by a register-mapped FPGA that is on the DS21458 daughter card.
- The definition file for this FPGA is named DS21458DC\_FPGA.def. See [Table 2](#) for the FPGA Register Map definitions. A drop-down menu on the top of the screen allows for switching between definition files.
- All files referenced above are available for download as described in the *Basic Configuration* section.

**Quick Setup (Demo Mode)**

- The PC will load ChipView offering a choice among DEMO MODE, REGISTER VIEW, and TERMINAL MODE. Select Demo Mode.
- The program will request a configuration file. Select among the displayed files, which are DS2155\_E1\_DSNCOM\_DRVR.cfg or DS2155\_T1\_DSNCOM\_DRVR.cfg.
- The Demo Mode screen will appear. Upon external loopback the RLOS indicators will turn green.
- Note: Demo Mode interacts with the device driver, which resides in the DK101/DK2000 firmware. The current implementation of this driver is for one device. As such, the demo mode will only interact with Port 1. With minor changes, the device driver is extendible to N devices.

**Quick Setup (Register View)**

- The PC will load ChipView offering a choice among DEMO MODE, REGISTER VIEW, and TERMINAL MODE. Select Register View.
- The program will request a definition file. Select DS21458DC\_FPGA.def through the Links section. This will also load DS21458DC.def.
- The Register View Screen will appear, showing the register names, acronyms, and values for the DS21458.
- 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 DS21458\_T1\_BERT\_ESF.ini.
  - After loading the INI file, the following may be observed:
    - The RLOS LEDs turns green upon external loopback.
    - All four ports of the DS21458 begin transmitting a Daly pattern. When external loopback is applied, the BERT bit count registers BBC1 to BBC3 and BEC1 to BEC3 may be updated by clearing and setting BC1.LC and clicking the 'Read All' button.

## ADDRESS MAP

DK101 daughter card address space begins at 0x81000000

DK2000 daughter card address space begins at:

0x30000000 for slot 0

0x40000000 for slot 1

0x50000000 for slot 2

0x60000000 for slot 3

All offsets given below are relative to the beginning of the daughter card address space (shown above).

**Table 1. Daughter Card Address Map**

OFFSET	DEVICE	DESCRIPTION
0X0000 to 0X0015	FPGA	Board identification and clock/signal routing
0X1000 to 0X10ff	T1/E1/J1 Transceiver #1	DS21458 T1/E1/J1 transceiver, port 1
0X1100 to 0X11ff	T1/E1/J1 Transceiver #2	DS21458 T1/E1/J1 transceiver, port 2
0X1200 to 0X12ff	T1/E1/J1 Transceiver #3	DS21458 T1/E1/J1 transceiver, port 3
0X1300 to 0X13ff	T1/E1/J1 Transceiver #4	DS21458 T1/E1/J1 transceiver, port 4

Registers in the FPGA can be easily modified using the ChipView host-based user-interface software along with the definition file named "DS21458DC\_FPGA.def."

## FPGA REGISTER MAP

**Table 2. FPGA Register Map**

OFFSET	NAME	TYPE	DESCRIPTION
0X0000	BID	Read Only	BOARD ID
0X0002	XBIDH	Read Only	HIGH NIBBLE EXTENDED BOARD ID
0X0003	XBIDM	Read Only	MIDDLE NIBBLE EXTENDED BOARD ID
0X0004	XBIDL	Read Only	LOW NIBBLE EXTENDED BOARD ID
0X0005	BREV	Read Only	BOARD FAB REVISION
0X0006	AREV	Read Only	BOARD ASSEMBLY REVISION
0X0007	PREV	Read Only	PLD REVISION
0X0011	MCSR	Control	DS21458 MCLK Pin Source
0X0012	TCSR	Control	DS21458 TCLK Pin Source
0X0013	SYSCLKT	Control	DS21458 TSYSCLK Pin Setting
0X0014	SYSCLKR	Control	DS21458 RSYSCLK Pin Setting
0X0015	SYNC1	Control	DS21458 TSYNC Source
0X0016	SYNC2	Control	DS21458 TSSYNC Source
0X0017	SYNC3	Control	DS21458 RSYNC Source
0X0018	TSERS	Control	TSER Source
0X0019	PRSER	Control	PCM RSER Source
0X001A	PSYNC	Control	PCM RSYNC/TSYNC Source
0X001B	PCLK	Control	PCM RCLK/TCLK Source

## ID REGISTERS

### **BID: BOARD ID (Offset = 0X0000)**

BID is read only with a value of 0xD.

### **XBIDH: HIGH NIBBLE EXTENDED BOARD ID (Offset = 0X0002)**

XBIDH is read only with a value of 0x0.

### **XBIDM: MIDDLE NIBBLE EXTENDED BOARD ID (Offset = 0X0003)**

XBIDM is read only with a value of 0x1.

### **XBIDL: LOW NIBBLE EXTENDED BOARD ID (Offset = 0X0004)**

XBIDL is read only with a value of 0x6.

### **BREV: BOARD FAB REVISION (Offset = 0X0005)**

BREV is read only and displays the current fab revision.

### **AREV: BOARD ASSEMBLY REVISION (Offset = 0X0006)**

AREV is read only and displays the current assembly revision.

### **PREV: PLD REVISION (Offset = 0X0007)**

PREV is read only and displays the current PLD firmware revision.

## CONTROL REGISTERS

Register Name: **MCSR**

Register Description: **DS21458 MCLK Pin Source**

Register Offset: **0x0011**

Bit #	7	6	5	4	3	2	1	0
Name	—	—	—	—	—	—	MSRCB	MSRCA
Default	—	—	—	—	—	—	1	1

**Bit 0: DS21458 Port 1 and 3 MCLK Source (MSRCA)**

0 = Connect MCLK 1 (controls port 1 and 3) to the 1.544MHz clock

1 = Connect MCLK 1 (controls port 1 and 3) to the 2.048MHz clock

**Bit 1: DS21458 Port 2 and 4 MCLK Source (MSRCA)**

0 = Connect MCLK 2 (controls port 2 and 4) to the 1.544MHz clock

1 = Connect MCLK 2 (controls port 2 and 4) to the 2.048MHz clock

Register Name: **TCSR**

Register Description: **DS21458 TCLK Pin Source**

Register Offset: **0x0012**

Bit #	7	6	5	4	3	2	1	0
Name	T4S1	T4S0	T3S1	T3S0	T2S1	T2S0	T1S1	T1S0
Default	0	0	0	0	0	0	0	0

**Bit 0 to 1: DS21458 Port 1 TCLK Source (T1S0, T1S1)**

The source for TCLK 1 is Defined as shown in Table 3.

**Bit 2 to 3: DS21458 Port 2 TCLK Source (T2S0, T2S1)**

The source for TCLK 2 is Defined as shown in Table 3.

**Bit 4 to 5: DS21458 Port 3 TCLK Source (T3S0, T3S1)**

The source for TCLK 3 is Defined as shown in Table 3.

**Bit 6 to 7: DS21458 Port 4 TCLK Source (T4S0, T4S1)**

The source for TCLK 4 is Defined as shown in Table 3.

**Table 3. TCLKx Source Definition**

TxS1, TxS0	TCLK CONNECTION
00	Drive TCLK <sub>x</sub> with the 1.544MHz clock
01	Drive TCLK <sub>x</sub> with the 2.048MHz clock
10	Drive TCLK <sub>x</sub> with RCLK <sub>x</sub>
11	N/A

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 DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card

 Register Name: **SYSCLKT**

 Register Description: **DS21458 TSYCLK Pin Setting**

 Register Offset: **0x0013**

Bit #	7	6	5	4	3	2	1	0
Name	R4S1	R4S0	R3S1	R3S0	R2S1	R2S0	R1S1	R1S0
Default	0	0	0	0	0	0	0	0

**Bit 0 to 1: DS21458 Port 1 TSYCLK Source (R1S0, R1S1)**

The source for TSYCLK 1 is Defined as shown in Table 4.

**Bit 2 to 3: DS21458 Port 2 TSYCLK Source (R2S0, R2S1)**

The source for TSYCLK 2 is Defined as shown in Table 4.

**Bit 4 to 5: DS21458 Port 3 TSYCLK Source (R3S0, R3S1)**

The source for TSYCLK 3 is Defined as shown in Table 4.

**Bit 6 to 7: DS21458 Port 4 TSYCLK Source (R4S0, R4S1)**

The source for TSYCLK 4 is Defined as shown in Table 4.

**Table 4. TSYCLK<sub>x</sub> Source Definition**

RxS1, RxS0	TSYCLK <sub>x</sub> CONNECTION
00	Drive TSYCLK <sub>x</sub> with the 1.544MHz clock
01	Drive TSYCLK <sub>x</sub> with the 2.048MHz clock
10	Drive TSYCLK <sub>x</sub> with 8.192MHz clock
11	Drive TSYCLK <sub>x</sub> with DS21458 Port <sub>x</sub> BPCLK

DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card

Register Name: **SYSCLKR**

Register Description: **DS21458 RSYCLK Pin Setting**

Register Offset: **0x0014**

Bit #	7	6	5	4	3	2	1	0
Name	T4S1	T4S0	T3S1	T3S0	T2S1	T2S0	T1S1	T1S0
Default	0	0	0	0	0	0	0	0

**Bit 0 to 1: DS21458 Port 1 RSYCLK Source (T1S0, T1S1)**

The source for RSYCLK 1 is Defined as shown in Table 5.

**Bit 2 to 3: DS21458 Port 2 RSYCLK Source (T2S0, T2S1)**

The source for RSYCLK 2 is Defined as shown in Table 5.

**Bit 4 to 5: DS21458 Port 3 RSYCLK Source (T3S0, T3S1)**

The source for RSYCLK 3 is Defined as shown in Table 5.

**Bit 6 to 7: DS21458 Port 4 RSYCLK Source (T4S0, T4S1)**

The source for RSYCLK 4 is Defined as shown in Table 5.

**Table 5. RSYCLK<sub>x</sub> Source Definition**

TxS1, TxS0	RSYCLK <sub>x</sub> CONNECTION
00	Drive RSYCLK <sub>x</sub> with the 1.544MHz clock
01	Drive RSYCLK <sub>x</sub> with the 2.048MHz clock
10	Drive RSYCLK <sub>x</sub> with 8.192MHz clock
11	Drive RSYCLK <sub>x</sub> with DS21458 Port <sub>x</sub> BPCLK

Register Name: **SYNC1**

Register Description: **DS21458 TSYNC Pin Source**

Register Offset: **0x0015**

Bit #	7	6	5	4	3	2	1	0
Name	—	—	—	—	T4SRC	T3SRC	T2SRC	T1SRC
Default	—	—	—	—	0	0	0	0

**Bit 0: DS21458 Port 1 TSYNC Source (T1SRC)**

0 = TSYNC 1 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSYNC 1 with RSYNC 1

**Bit 1: DS21458 Port 2 TSYNC Source (T2SRC)**

0 = TSYNC 2 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSYNC 2 with RSYNC 2

**Bit 2: DS21458 Port 3 TSYNC Source (T3SRC)**

0 = TSYNC 3 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSYNC 3 with RSYNC 3

**Bit 3: DS21458 Port 4 TSYNC Source (T4SRC)**

0 = TSYNC 4 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSYNC 4 with RSYNC 4

**Note:** When driving TSYNC<sub>x</sub> with RSYNC<sub>x</sub> the corresponding DS21458 port should be configured such that TSYNC<sub>x</sub> is an input (IOCR1.1 = 0) and RSYNC<sub>x</sub> is an output (IOCR1.4 = 0).

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**DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card**


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**Register Name: SYNC2**
**Register Description: DS21458 TSSYNC Pin Source**
**Register Offset: 0x0016**

Bit #	7	6	5	4	3	2	1	0
Name	—	—	—	—	T4SRC	T3SRC	T2SRC	T1SRC
Default	—	—	—	—	0	0	0	0

**Bit 0: DS21458 Port 1 TSSYNC Source (T1SRC)**

0 = Not using transmit-side elastic store, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSSYNC 1 with RSYNC 1

**Bit 1: DS21458 Port 2 TSSYNC Source (T2SRC)**

0 = Not using transmit-side elastic store, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSSYNC 2 with RSYNC 2

**Bit 2: DS21458 Port 3 TSSYNC Source (T3SRC)**

0 = Not using transmit-side elastic store, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSSYNC 3 with RSYNC 3

**Bit 3: DS21458 Port 4 TSSYNC Source (T4Source)**

0 = Not using transmit-side elastic store, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive TSSYNC 4 with RSYNC 4

**Note:** When driving TSSYNCx with RSYNCx the corresponding DS21458 port should be configured such that RSYNCx is an output (IOCR1.4 = 0).

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DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card

Register Name: **SYNC3**

Register Description: **DS21458 RSYNC Pin Setting**

Register Offset: **0x0017**

Bit #	7	6	5	4	3	2	1	0
Name	RSOR1	RSOR0	—	—	R4IO	R3IO	R2IO	R1IO
Default	0	0	—	—	0	0	0	0

**Bit 0: DS21458 Port 1 RSYNC Setting (R1IO)**

0 = RSYNC 1 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive RSYNC 1 with RSYNC<sub>x</sub> as shown in Table 6

**Bit 1: DS21458 Port 2 RSYNC Setting (R2IO)**

0 = RSYNC 2 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive RSYNC 2 with RSYNC<sub>x</sub> as shown in Table 6

**Bit 2: DS21458 Port 3 RSYNC Setting (R3IO)**

0 = RSYNC 3 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive RSYNC 4 with RSYNC<sub>x</sub> as shown in Table 6

**Bit 3: DS21458 Port 4 RSYNC Setting (R4IO)**

0 = RSYNC 4 is an output, tri-state corresponding FPGA driver pin (weak pulldown)

1 = Drive RSYNC 4 with RSYNC<sub>x</sub> as shown in Table 6

**Note:** When driving RSYNC<sub>y</sub> with RSYNC<sub>x</sub> the corresponding DS21458 port should be configured such that RSYNC<sub>x</sub> is an output (IOCR1.4 = 0) and RSYNC<sub>y</sub> is an input (IOCR1.4 = 1).

**Table 6. RSYNC<sub>x</sub> Function Definition**

RSOR1, RSOR0	MASTER RSYNC DESIGNATION
00	RSYNC 1 is used to drive other RSYNC pins (providing R <sub>x</sub> IO = 1)
01	RSYNC 2 is used to drive other RSYNC pins (providing R <sub>x</sub> IO = 1)
10	RSYNC 3 is used to drive other RSYNC pins (providing R <sub>x</sub> IO = 1)
11	RSYNC 4 is used to drive other RSYNC pins (providing R <sub>x</sub> IO = 1)

DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card

Register Name: **TSERS**

Register Description: **DS21458 TSER Pin Source**

Register Offset: **0x0018**

Bit #	7	6	5	4	3	2	1	0
Name	T4S1	T4S0	T3S1	T3S0	T2S1	T2S0	T1S1	T1S0
Default	0	0	0	0	0	0	0	0

**Bit 0 to 1: DS21458 Port 1 TSER Source (T1S0, T1S1)**

The source for TSER 1 is Defined as shown in Table 7.

**Bit 2 to 3: DS21458 Port 2 TSER Source (T2S0, T2S1)**

The source for TSER 2 is Defined as shown in Table 7.

**Bit 4 to 5: DS21458 Port 3 TSER Source (T3S0, T3S1)**

The source for TSER 3 is Defined as shown in Table 7.

**Bit 6 to 7: DS21458 Port 4 TSER Source (T4S0, T4S1)**

The source for TSER 4 is Defined as shown in Table 7.

**Table 7. TSERx Source Definition**

TxS1, TxS0	TSER <sub>x</sub> CONNECTION
00	Tri-state TSER <sub>x</sub> (weak pulldown)
01	Drive TSER <sub>x</sub> with RSER <sub>x</sub>
10	Drive TSER <sub>x</sub> with PCM_TXD bus (DK2000 only)
11	N/A

Register Name: **PRSER**

Register Description: **PCM RSER Source**

Register Offset: **0x0019**

Bit #	7	6	5	4	3	2	1	0
Name	—	—	—	—	R1EN	R1EN	R1EN	R1EN
Default	—	—	—	—	0	0	0	0

**Bit 0 to 1: PCM RSER Source (R1EN)**

0 = Do not drive DS21458 Port 1 RSER onto PCM\_RSER

1 = Logically OR DS21458 Port 1 RSER with selected other RSER pins and drive onto PCM\_RSER

**Bit 2 to 3: DS21458 Port 2 TSER Source (T2S0, T2S1)**

0 = Do not drive DS21458 Port 2 RSER onto PCM\_RSER

1 = Logically OR DS21458 Port 2 RSER with selected other RSER pins and drive onto PCM\_RSER

**Bit 4 to 5: DS21458 Port 3 TSER Source (T3S0, T3S1)**

0 = Do not drive DS21458 Port 3 RSER onto PCM\_RSER

1 = Logically OR DS21458 Port 3 RSER with selected other RSER pins and drive onto PCM\_RSER

**Bit 6 to 7: DS21458 Port 4 TSER Source (T4S0, T4S1)**

0 = Do not drive DS21458 Port 4 RSER onto PCM\_RSER

1 = Logically OR DS21458 Port 4 RSER with selected other RSER pins and drive onto PCM\_RSER

**Note:** PRSER register is for use with the DK2000 only.

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**DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card**


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**Register Name: PSYNC**
**Register Description: PCM\_RSYNC/TSYNC Source**
**Register Offset: 0x001A**

Bit #	7	6	5	4	3	2	1	0
Name	—	—	T2SR	T1SR	—	—	R2SR	R1SR
Default	—	—	0	0	—	—	0	0

**Bit 0 to 1: PCM\_RSYNC Source**

<b>PCM_RSYNC SOURCE</b>	
00	PCM_RSYNC is driven by DS21458 port 1 RSYNC
01	PCM_RSYNC is driven by DS21458 port 2 RSYNC
10	PCM_RSYNC is driven by DS21458 port 3 RSYNC
11	PCM_RSYNC is driven by DS21458 port 4 RSYNC

**Bit 4 to 5: PCM\_TSYNC Source**

<b>PCM_TSYNC SOURCE</b>	
00	PCM_TSYNC is driven by DS21458 port 1 TSYNC
01	PCM_TSYNC is driven by DS21458 port 2 TSYNC
10	PCM_TSYNC is driven by DS21458 port 3 TSYNC
11	PCM_TSYNC is driven by DS21458 port 4 TSYNC

**Note:** PSYNC register is for use with the DK2000 only.

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DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card

**Register Name: PCLK**
**Register Description: PCM\_RCLK/TCLK Source**
**Register Offset: 0x001B**

Bit #	7	6	5	4	3	2	1	0
Name	—	TCM	T2SR	T1SR	—	RCM	R2SR	R1SR
Default	—	0	0	0	—	0	0	0

**Bit 0 to 2: PCM\_RCLK Source**

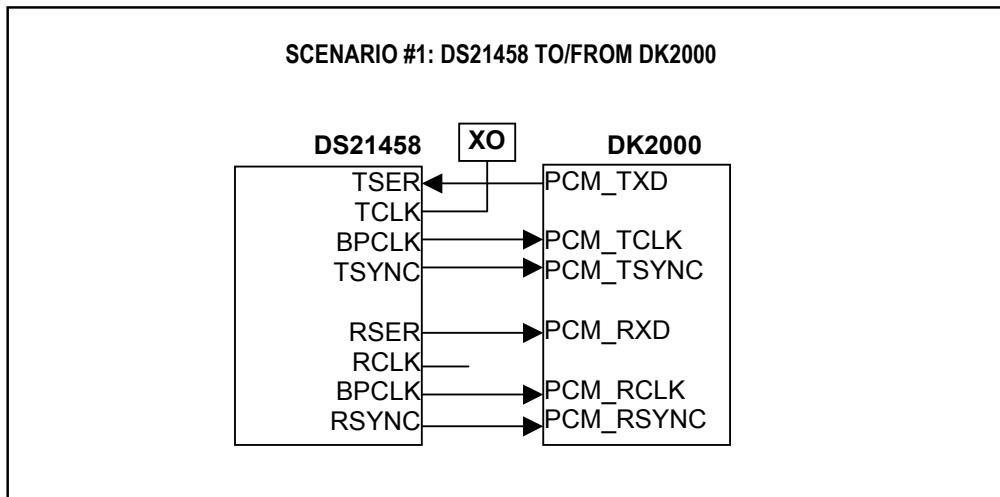
RCM,R2SR, R1SR	PCM_RCLK SOURCE
000	PCM_RCLK is driven by DS21458 port 1 RCLK
001	PCM_RCLK is driven by DS21458 port 2 RCLK
010	PCM_RCLK is driven by DS21458 port 3 RCLK
011	PCM_RCLK is driven by DS21458 port 4 RCLK
100	PCM_RCLK is driven by DS21458 port 1 BPCLK
101	PCM_RCLK is driven by DS21458 port 2 BPCLK
110	PCM_RCLK is driven by DS21458 port 3 BPCLK
111	PCM_RCLK is driven by DS21458 port 4 BPCLK

**Bit 4 to 5: PCM\_TCLK Source**

TCM,T2SR, T1SR	PCM_TCLK SOURCE
000	PCM_TCLK is driven by source used for DS21458 port 1 TCLK
001	PCM_TCLK is driven by source used for DS21458 port 2 TCLK
010	PCM_TCLK is driven by source used for DS21458 port 3 TCLK
011	PCM_TCLK is driven by source used for DS21458 port 4 TCLK
100	PCM_TCLK is driven by DS21458 port 1 BPCLK
101	PCM_TCLK is driven by DS21458 port 2 BPCLK
110	PCM_TCLK is driven by DS21458 port 3 BPCLK
111	PCM_TCLK is driven by DS21458 port 4 BPCLK

**Note:** PCLK register is for use with the DK2000 only.

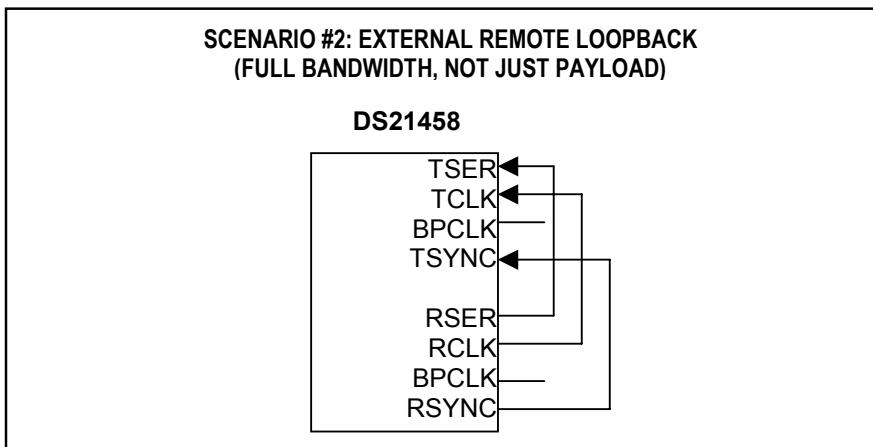
## FPGA CONTROL EXAMPLES



**Table 8. FPGA Configuration for Scenario #1 (Port 1, T1 Mode)**

REGISTER	SETTING	COMMENT
MCSR	0X01	Drive DS21458 ports 1 and 3 MCLK with 2.048MHz
TCSR	0X00	Drive TCLK with 1.544MHz
SYSCLKT	0X00	Drive TSYNSCLK with 1.544MHz
SYSCLKR	0X00	Drive RSYNSCLK with 1.544MHz
SYNC1	0X00	Tri-state FPGA driver pin for DS21458 TSYNC1
SYNC2	0X01	Drive TSSYNC1 with RSYNC1
SYNC3	0X00	Tri-state FPGA driver pin for DS21458 RSYNC
TSERS	0X02	Drive DS21458 TSER1 with data from PCM bus
PRSER	0X01	Drive DS21458 RSER1 onto PCM bus
PSYNC	0X00	PCM RSYNC and PCM TSYNC are provided by DS21458 port 1 RSYNC and TSYNC (respectively)
PCLK	0X44	PCM RCLK and TCLK are driven by port 1 BPCLK

## FPGA CONTROL EXAMPLES (continued)



**Table 9. FPGA Configuration for Scenario #2 (Port 1, T1 Mode)**

REGISTER	SETTING	COMMENT
MCSR	0X01	Drive DS21458 ports 1 and 3 MCLK with 2.048MHz
TCSR	0X02	Drive TCLK1 with RCLK1
SYSLKT	0X00	Drive TSYSLKT with 1.544MHz
SYSLKR	0X00	Drive RSYSLKT with 1.544MHz
SYNC1	0X01	Drive TSYNC1 with RSYNC1
SYNC2	0X01	Drive TSYNC2 with RSYNC1
SYNC3	0X00	Tri-state FPGA driver pin for DS21458 RSYNC
TSERS	0X01	Drive DS21458 TSER1 with data from RSER1
PRSER	N/A	Unused
PSYNC	N/A	Unused
PCLK	N/A	Unused

**Table 10. DS21458 Partial Configuration for Scenario #2 (Port 1, T1 Mode)**

REGISTER	SETTING	COMMENT
IOCR1	TSIO = 0; RSIO = 0	TSYNC is an input, RSYNC is an output
ESCR	TESE = 0; RESE = 0	Bypass Rx and Tx elastic stores
CCR1	TCSS1 = 0; TCSS2 = 0	TCLK is driven by TCLK pin

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**DS21458DK, Quad T1/E1/J1 Transceiver Design Kit Daughter Card****DS21458 INFORMATION**

For more information about the DS21458, please consult the DS21458 data sheet available on our website at [www.maxim-ic.com/DS21458](http://www.maxim-ic.com/DS21458). Software downloads are also available for this design kit.

**DS21458DK INFORMATION**

For more information about the DS21458DK, including software downloads, please consult the DS21458DK data sheet available on our website at [www.maxim-ic.com/DS21458DK](http://www.maxim-ic.com/DS21458DK).

**TECHNICAL SUPPORT**

For additional technical support, please e-mail your questions to [telecom.support@dalsemi.com](mailto:telecom.support@dalsemi.com).

**SCHEMATICS**

The DS21458DK schematics are featured at the end of this document.

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# DS21458 DESIGN KIT

**CONTENTS**

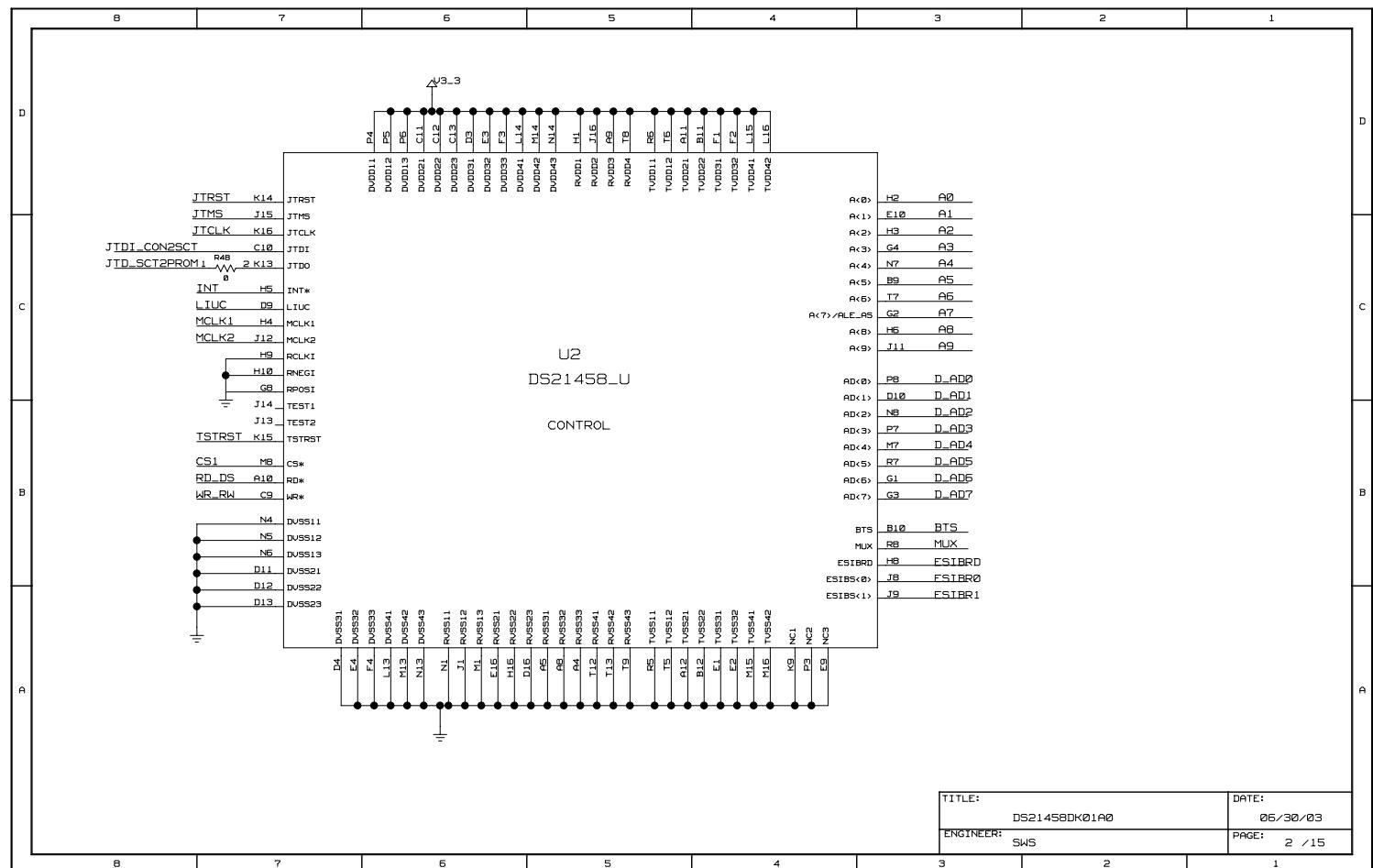
1. COVER PAGE
2. DS21458 CONTROL AND BACKPLANE
3. PORT 1 AND 2 TX / RX SYSTEM SIDE
4. PORT 3 AND 4 TX / RX SYSTEM SIDE
5. PORT 1 TX / RX ANALOG PATHS
6. PORT 2 TX / RX ANALOG PATHS
7. PORT 3 TX / RX ANALOG PATHS
8. PORT 4 TX / RX ANALOG PATHS
9. DAUGHTER CARD ADDRESS DATA BUS CONNECTION
10. FPGA CROSS CONNECT FOR RX / TX SIGNALS
11. FPGA AND CONFIG PROM CONTROL
12. FPGA CLOCK AND DATABUS
13. SUPPLY DECOUPLING
14. SIGNAL CROSS-REFERENCE
15. COMPONENT CROSS-REFERENCE

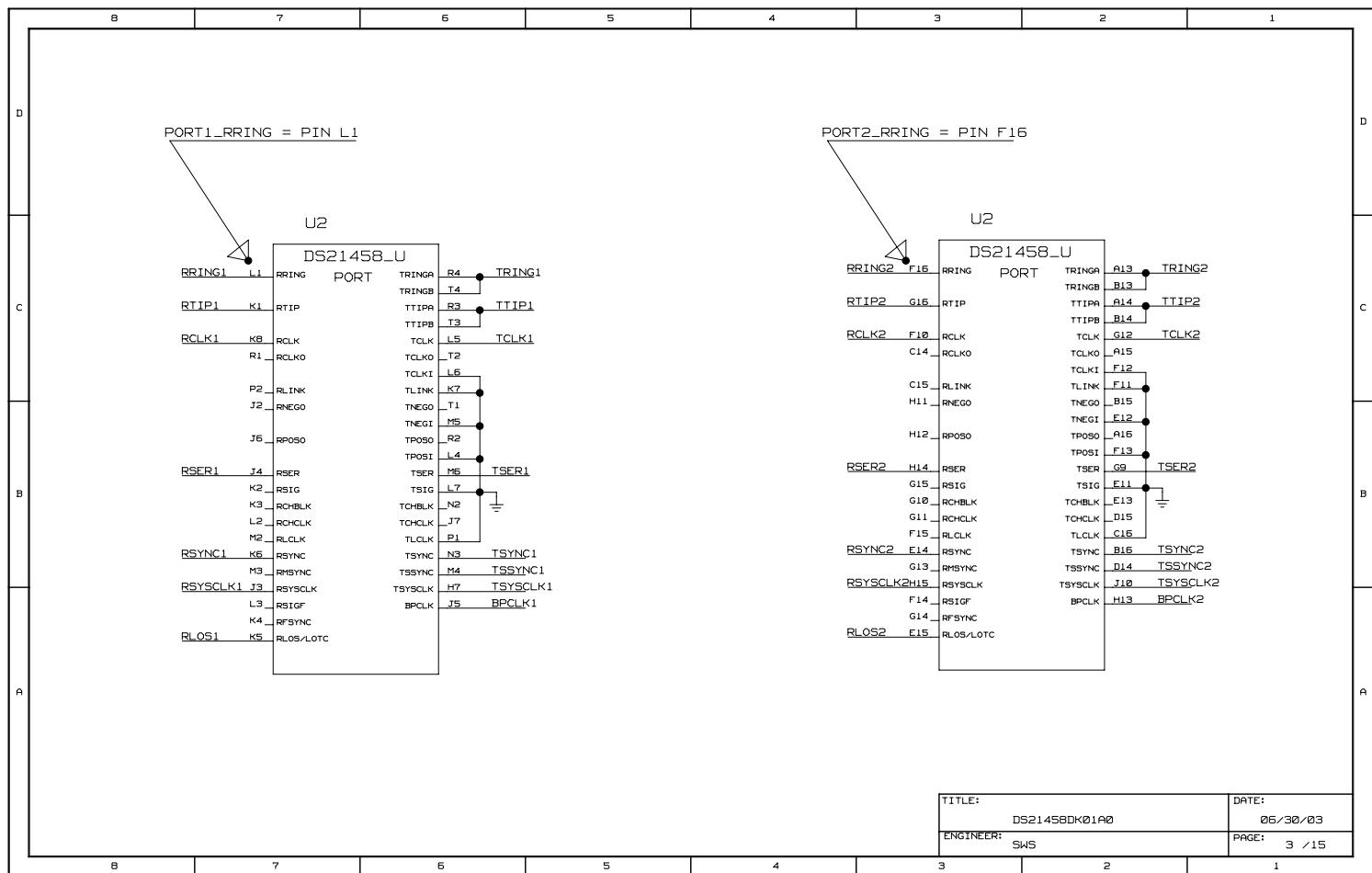
**REVISIONS:** (MODIFICATION FROM DS21055 BOARD)

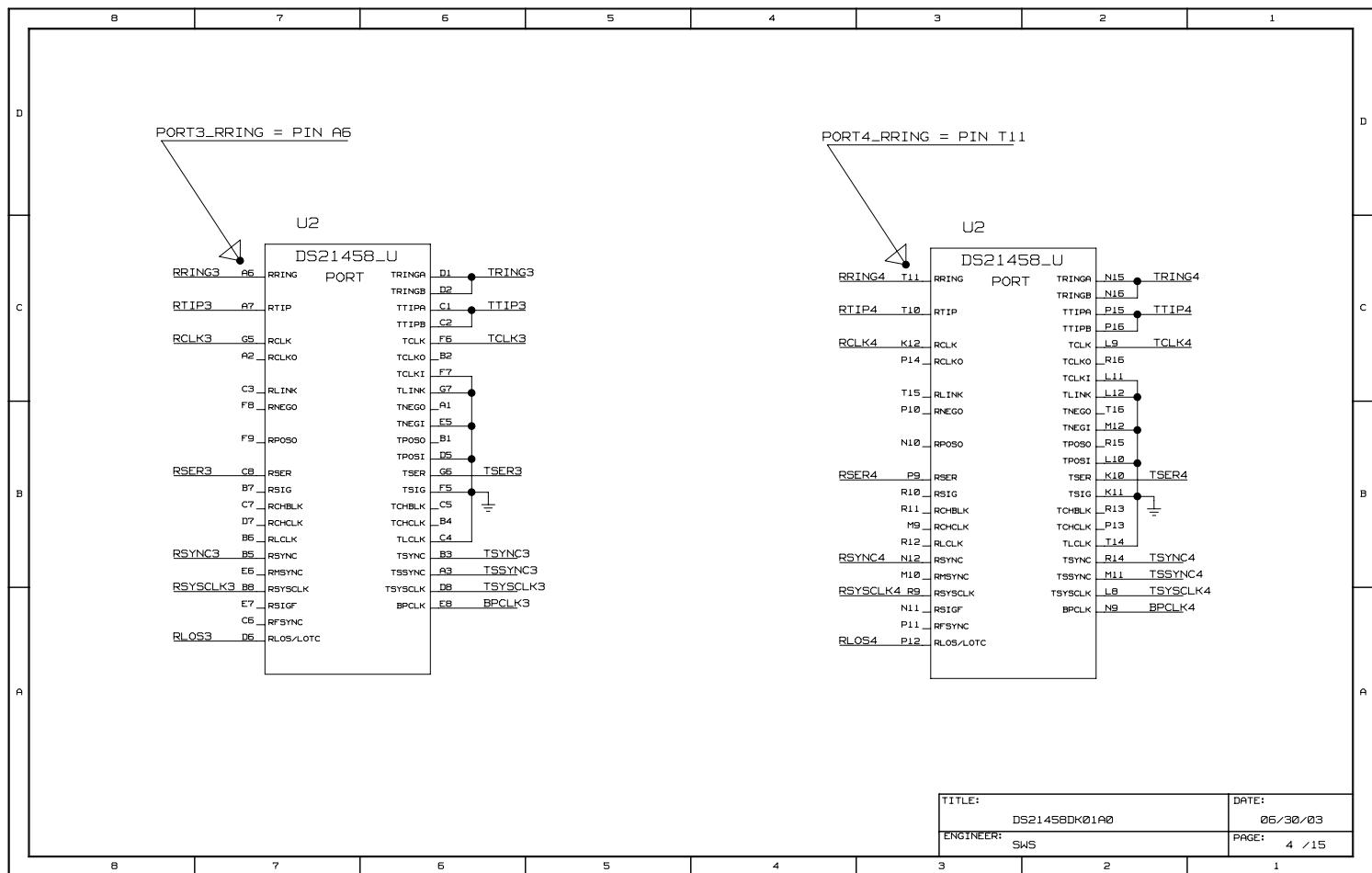
1. ESIBRD CONNECTIONS CHANGE FROM 4X TO 1X (ONLY PULLDOWNS REMAIN)
2. ADDED A8 AND A9 TO DS21458 AND FPGA, REMOVED CS2-4
3. REMOVED RLOS FPGA CONNECTION, RLOS LED IS NOW DRIVEN BY THE SCT
4. REMOVED SERIAL CONFIG PROM, REPLACED WITH XILINX FLASH BASED CONFIG PROM
5. RAN PIN SWAP ON XILINX PART TO ACCOMMODATE PIN DIFFERENCES BETWEEN DS21458 AND DS21055
6. REMOVED TEST POINTS IN JTAG CHAIN
7. REMOVED CONNECTION BETWEEN 2.5V SUPPLY MONITOR AND FPGA INIT PIN
8. REMOVED CONNECTION BETWEEN CPU RESET AND FPGA PROGRAM PIN  
-FPGA RESET IS NOW DRIVEN BY INTERNAL STATE MACHINE
9. CHANGED SWITCH NAMES FOR PORT 1-4 FROM SW PREFIX TO PRT PREFIX
10. ADDED T1 E1 DESIGNATION TO SWITCHES FOR PORT 1-4
11. CHANGED SILKSCREEN ON JTAG CONNECTOR

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DS21458DK01A0	06/30/03
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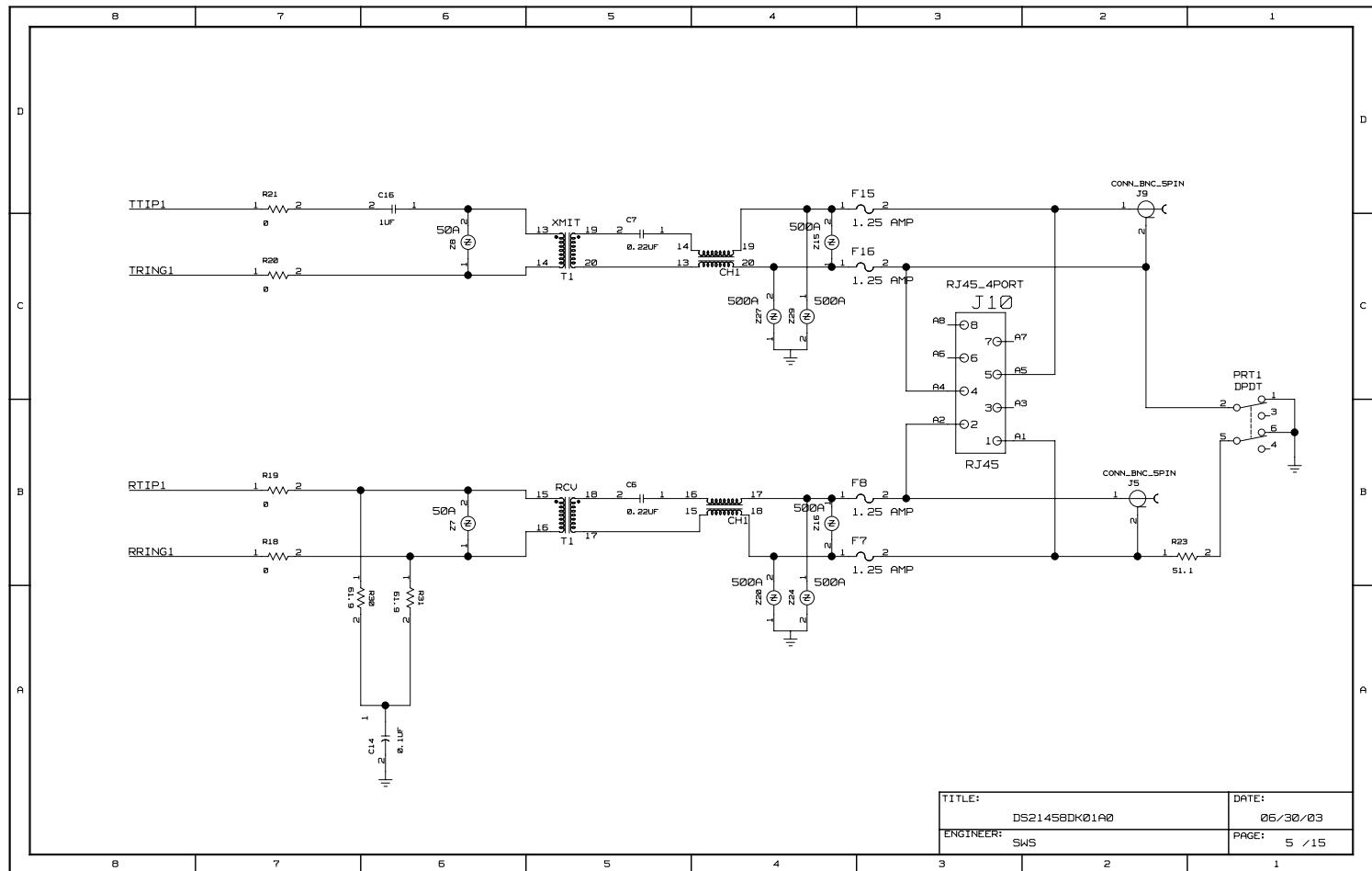
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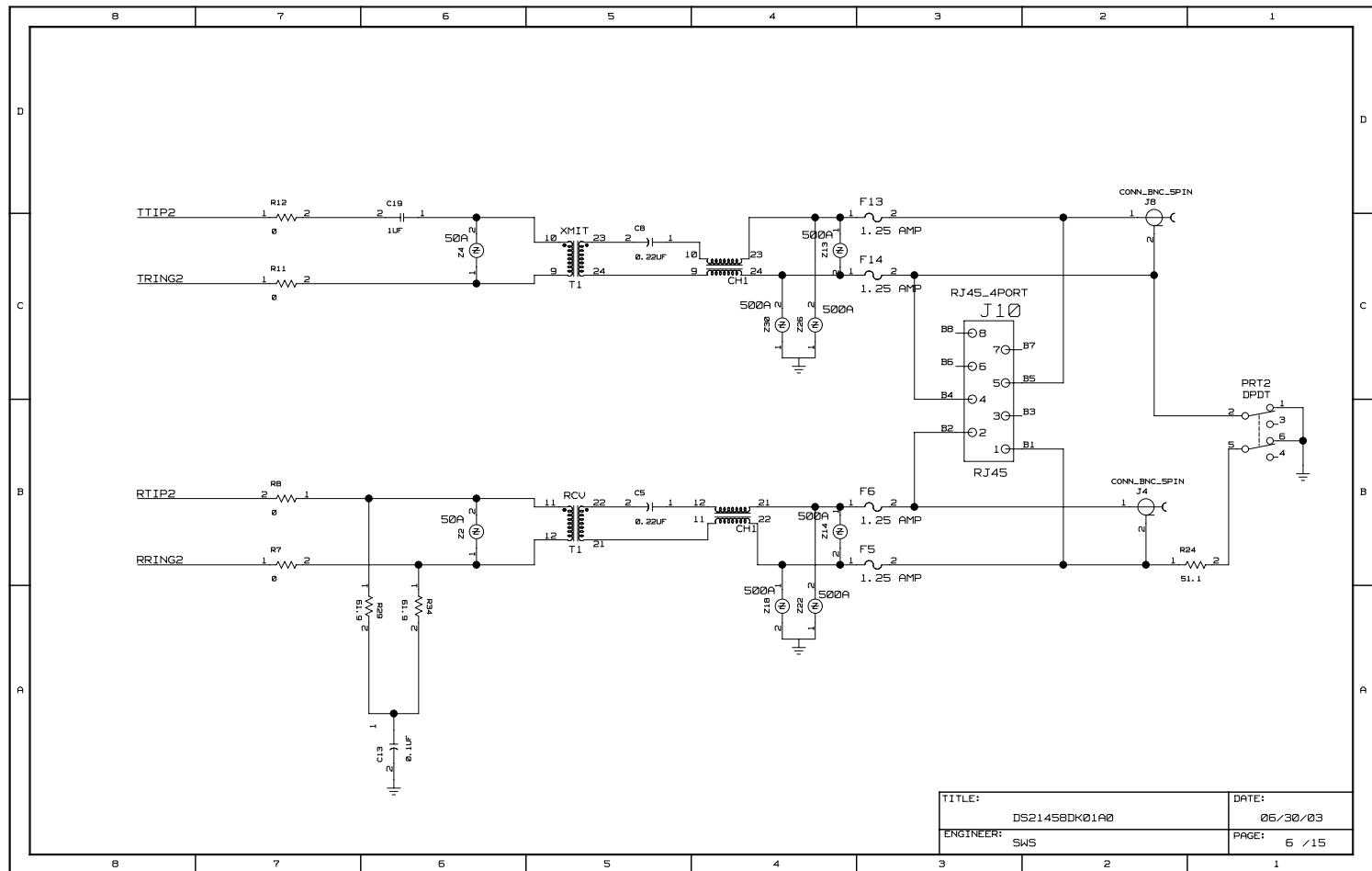


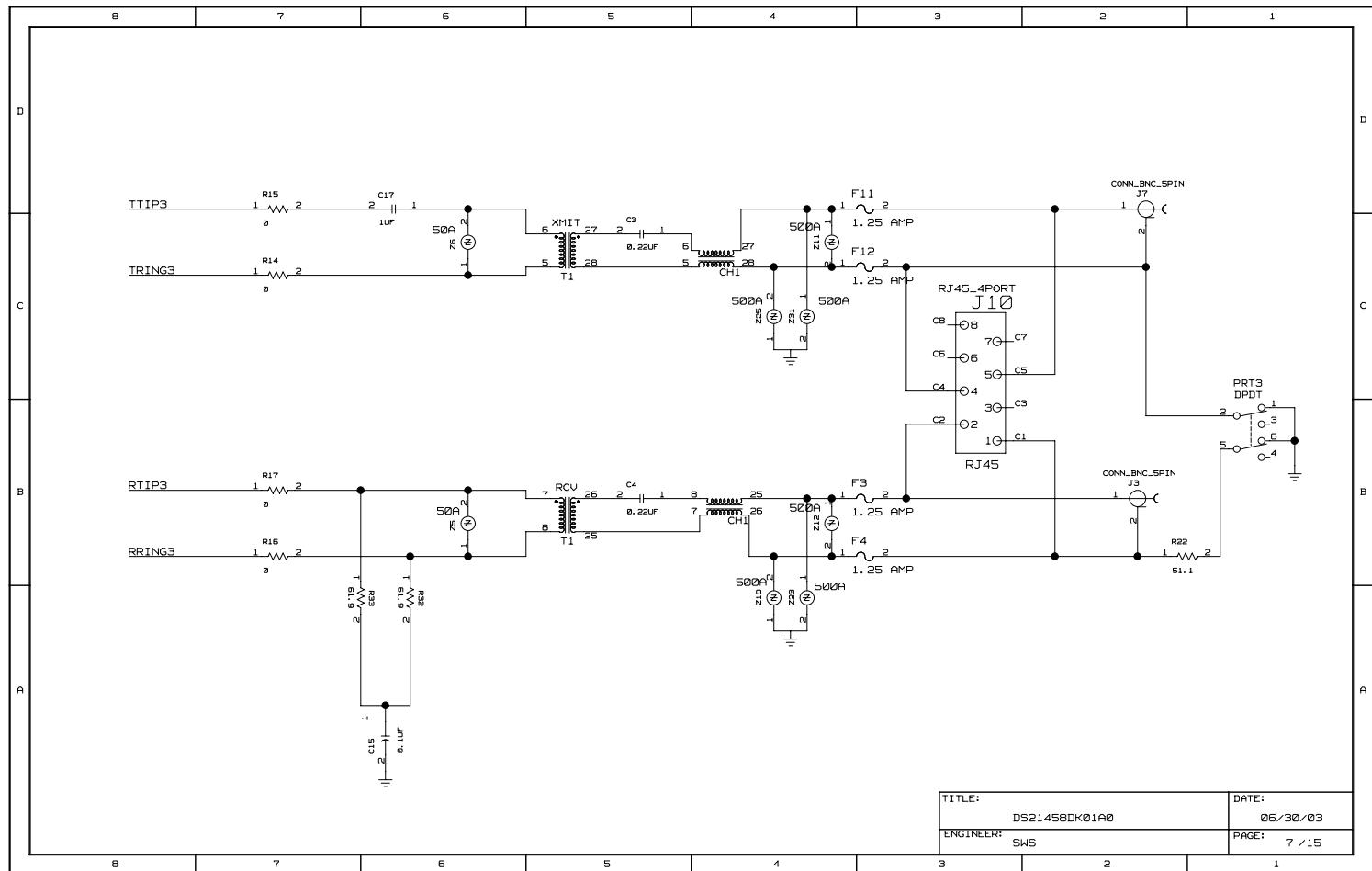


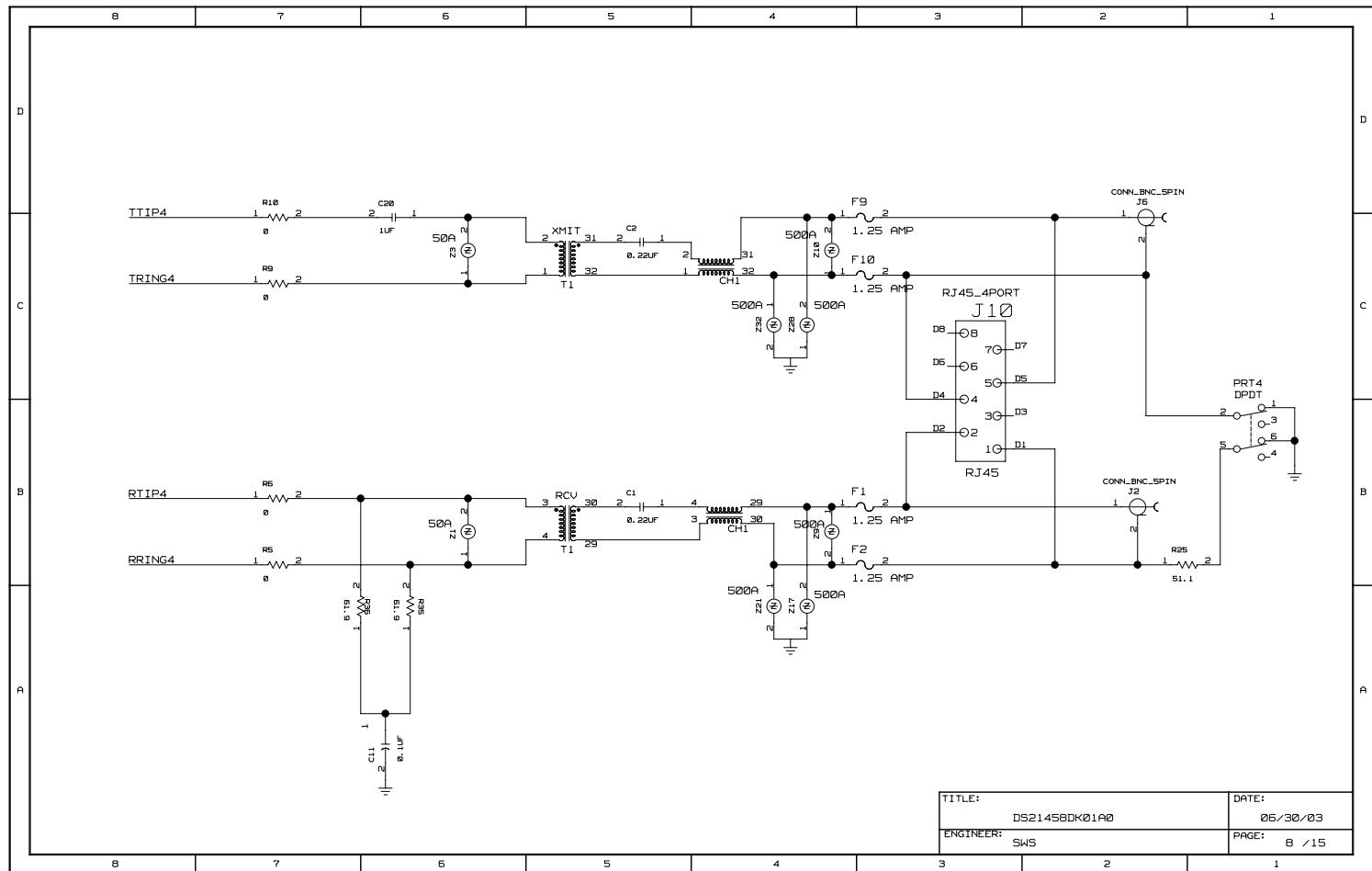


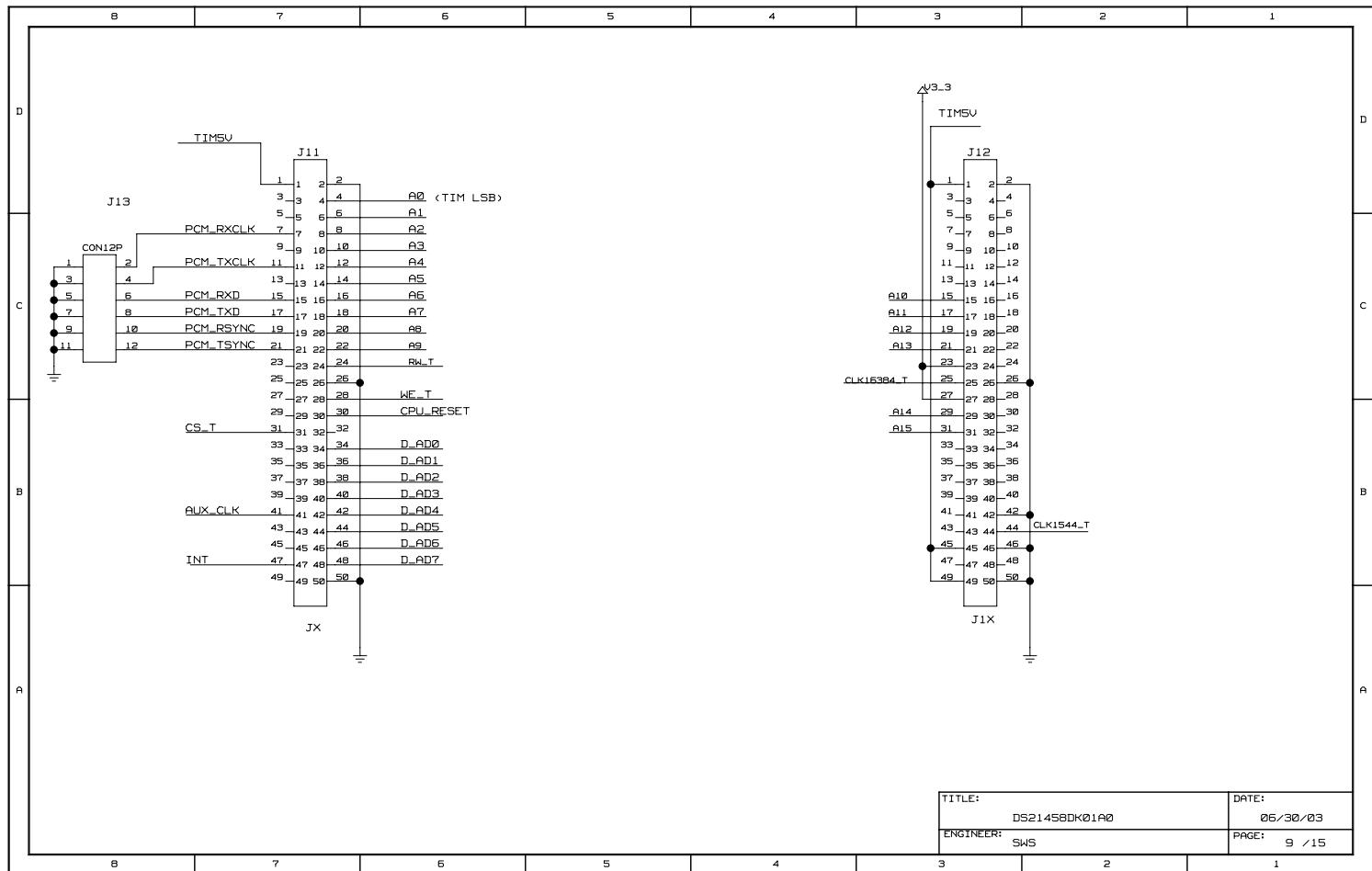
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ENGINEER: SWS		PAGE: 4 /15
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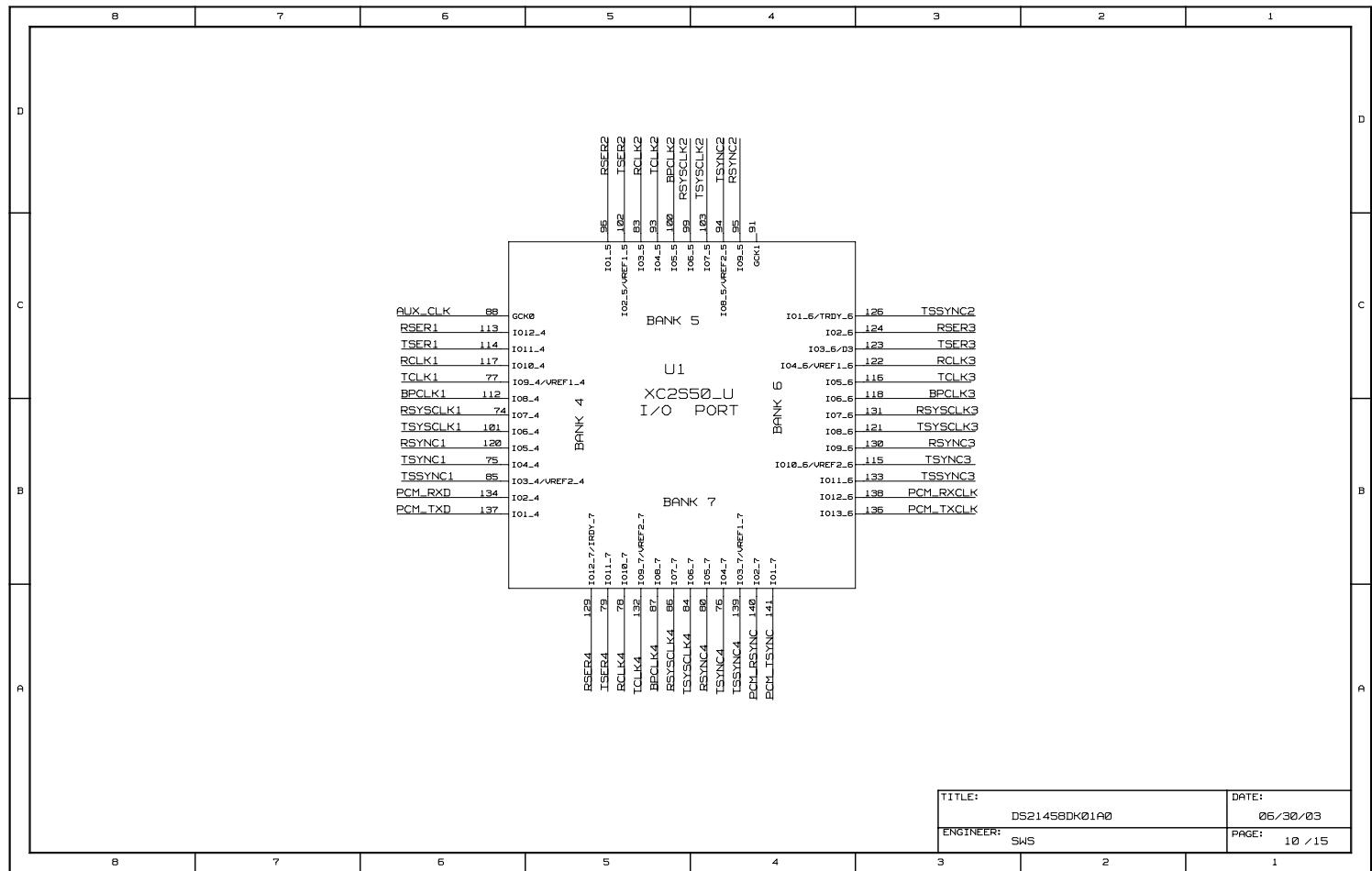








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