



Keywords: BSDL, JTAG, scan chain, boundary scan, chain mapping

## APPLICATION NOTE 406

# DS21Qx5y BSDL Scan Chain Mapping

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*Abstract: This application note describes the JTAG hardware boundary scan functions of the quad port single chip transceivers (SCTs). The JTAG functionality for the quad port devices is essentially the same as four separate DS21x5y devices daisy chained together. The DS21Q352, DS21Q354, DS21Q552, DS21Q554, and DS21Q55 do not have a single BSDL file because they are multichip modules that contain four separate die in the same package. The internal JTAG pins are either wired together in parallel or daisy chained as appropriate. The JTDI pin is connected to the JTDI input of the first die, while JTDO4 pin is connected to the JTDO output of the fourth die. JTRST, JTCLK, and JTMS are wired together in parallel. To complete the scan chain, four copies of the specific DS21x5y BSDL file need to be placed in the JTAG chain. The note contains a complete breakdown of the JTAG scan chain and explains how to access all of the boundary scan cells in the device.*

## Introduction

The JTAG functionality for the DS21Qx5y devices is essentially the same as four separate DS21x5y devices daisy chained together. The DS21Q352, DS21Q354, DS21Q552, and DS21Q554 do not have a single BSDL file because they are multichip modules that contain four separate die in the same package, with some of the pins wired together internally. The internal JTAG pins are either wired together in parallel or daisy chained as appropriate. The JTDI pin is connected to the JTDI input of the first die, while JTDO4 pin is connected to the JTDO output of the fourth die. JTRST, JTCLK, and JTMS are simply wired together in parallel. Because of this, four copies of the specific DS21x5y device BSDL file need to be placed in the JTAG chain for scanning the internal daisy chain of the DS21Qx5y.

## Recommendation for JTAG Design

In most cases, the DS21Qx5y device symbol was created as a single entity. In reality, the base of the DS21Qx5y is simply a printed wire board with the DS21x5y die with the connections detailed in the DS21Qx5y data sheet. To solve this issue, some additional work may be required to reflect the fact that the device is actually made up of four separate die. If the DS21Qx5y device and associated BSDL files are being used in a simulation program, there are two possible solutions. The easiest way to solve this problem is to alter the netlist after the design is complete to account for the internal connections. Another way is to create a hierarchy in the design. It is fairly simple to layout an extra page or two of schematic to reflect these internal connections. If however there is no need for the simulation and the DS21Qx5y is only being run on a physical board, the BSDL files can simply be used as is.

To alleviate the need for mapping individual pins on the BGA substrate the following Table 1 has been provided. The table contains the port location (SCT number), BGA pin, BSDL cell scan position, BSDL cell name, and other useful information. The table has been sorted by port location (SCT number) and then BSDL scan position. This should allow for easy access to the necessary information about which BSDL scan position maps to which port location and BGA pin number.

The BSDL files for the various DS21x5y devices can be found on the web at: [BSDL Files](#).

**Table 1. JTAG scan chain: BGA pin to BSDL cell mapping**

SCT PORT	BGA PIN	BSD L SCAN POSITION	BSD L SCAN NAME	I/O	DATA SHEET SYMBOL	DATA SHEET DESCRIPTION
1	--	0	RCL	Output	--	Internal to Package
1	M1	1	A8MCLK	Output	8MCLK1	8192 MHz Clock Based on RCLK1
1	M2	2	RCHBLK	Output	RCHBLK1	Receive Channel Block SCT1
1	H1	3	RSYSCLK	Input	RSYSCLK1	Receive System Clock SCT1
1	H2	4	RLOSLOT	Output	RLOS/LOT1	Receive LOS/LOT SCT1
1	G1	5	RSYNC	BiDir	RSYNC1	Receive Sync SCT1
1	--	6	--	Control	--	Internal to Package
1	K4	7	RFSYNC	Output	RFSYNC1	Receive Frame Sync SCT1
1	L1	8	RMSYNC	Output	RMSYNC1	Receive Multiframe Sync SCT1
1	J2	9	RSER	Output	RSER1	Receive Serial Data SCT1
1	L2	10	RSIG	Output	RSIG1	Receive Signaling Output SCT1
1	K1	11	RSIGF	Output	RSIGF1	Receive Signaling Freeze SCT1
1	J1	12	RCHCLK	Output	RCHCLK1	Receive Channel Clock SCT1
1	L4	13	RPOSO	Output	RPOSO1	Receive Positive Data Output SCT1
1	L3	14	RNEGO	Output	RNEGO1	Receive Negative Data Output SCT1
1	M3	15	RCLKO	Output	RCLKO1	Receive Clock Output SCT1
1	M4	16	RCLKI	Input	RCLKI1	Receive Clock Input SCT1
1	R3	17	RNEGI	Input	RNEGI1	Receive Negative Data Input SCT1
1	R4	18	RPOSI	Input	RPOSI1	Receive Positive Data Input SCT1
1	--	19	RDATA	Output	--	Internal to Package
1	N3	20	RCLK	Output	RCLK1	Receive Clock SCT1
1	F1	21	RLCLK	Output	RLCLK1	Receive Link Clock

						SCT1
1	G2	22	RLINK	Output	RLINK1	Receive Link Data SCT1
1	K3	23	WRRW	Input	<b>Active-Low WR (R/Active-Low W)</b>	Write Input (Read/Write)
1	--	24	FMS	Input	--	Internal to Package
1	P3	25	CS	Input	<b>Active-Low CS1</b>	Chip Select SCT1
1	N2	26	RDDS	Input	<b>Active-Low RD (Active-Low DS)</b>	Read Input (Data Strobe)
1	P4	27	ALESA7	Input	A7/ALE	Address Bus Bit 7/ALE
1	U8	28	A6	Input	A6	Address Bus Bit 6
1	H4	29	A5	Input	A5	Address Bus Bit 5
1	V8	30	A4	Input	A4	Address Bus Bit 4
1	T4	31	A3	Input	A3	Address Bus Bit 3
1	V2	32	A2	Input	A2	Address Bus Bit 2
1	L17	33	A1	Input	A1	Address Bus Bit 1
1	U3	34	A0	Input	A0	Address Bus Bit 0
1	U4	35	D7AD7	BiDir	D7/AD7	Data or Address/Data Bus Bit 7
1	V4	36	D6AD6	BiDir	D6/AD6	Data or Address/Data Bus Bit 6
1	U5	37	D5AD5	BiDir	D5/AD5	Data or Address/Data Bus Bit 5
1	U9	38	D4AD4	BiDir	D4/AD4	Data or Address/Data Bus Bit 4
1	U7	39	D3AD3	BiDir	D3/AD3	Data or Address/Data Bus Bit 3
1	W15	40	D2AD2	BiDir	D2/AD2	Data or Address/Data Bus Bit 2
1	J19	41	D1AD1	BiDir	D1/AD1	Data or Address/Data Bus Bit 1
1	U11	42	D0AD0	BiDir	D0/AD0	Data or Address/Data Bus Bit 0
1	--	43	--	Control	--	Internal to Package
1	U10	44	MUX	Input	MUX	Mux Bus Select
1	V9	45	CO	Output	CO1	Carry Output for IBO SCT1
1	V10	46	TCHCLK	Output	TCHCLK1	Transmit Channel Clock SCT1
1	W12	47	TSSYNC	Input	TSSYNC1	Transmit System Sync SCT1
1	W11	48	TSYSCLK	Input	TSYSCLK1	Transmit System Clock SCT1

1	--	49	TDATA	Input	--	Internal to Package
1	--	50	TESO	Output	--	Internal to Package
1	W10	51	TSIG	Input	TSIG1	Transmit Signaling Input SCT1
1	W9	52	TSER	Input	TSER1	Transmit Serial Data SCT1
1	Y9	53	TCLK	Input	TCLK1	Transmit Clock SCT1
1	V7	54	TPOSO	Output	TPOSO1	Transmit Positive Data Output SCT1
1	T3	55	TNEGO	Output	TNEGO1	Transmit Negative Data Output SCT1
1	W7	56	TCLKO	Output	TCLKO1	Transmit Clock Output SCT1
1	V6	57	TCLKI	Input	TCLKI1	Transmit Clock Input SCT1
1	R1	58	TNEGI	Input	TNEGI1	Transmit Negative Data Input SCT1
1	W3	59	TPOSI	Input	TPOSI1	Transmit Positive Data Input SCT1
1	V1	60	TSYNC	BiDir	TSYNC1	Transmit Sync SCT1
1	--	61	--	Control	--	Internal to Package
1	W6	62	CI	Input	CI1	Carry Input for IBO SCT1
1	W5	63	TLINK	Input	TLINK1	Transmit Link Data for SCT1
1	V3	64	TLCLK	Output	TLCLK1	Transmit Link Clock for SCT1
1	W1	65	TCHBLK	Output	TCHBLK1	Transmit Channel Block SCT1
1	U1	66	INT	Output	<b>Active-Low INT</b>	Interrupt
1	--	67	--	Internal	--	Internal to Package
1	--	68	--	Internal	--	Internal to Package
1	U16	69	TEST	Input	TEST	Test
1	--	70	A8XCLK	Output	--	Internal to Package
1	K2	71	LIUC	Input	LIUC	Line Interface Connect
1	P2	72	BTS	Input	BTS	Bus Type Select
2	--	0	RCL	Output	--	Internal to Package
2	H17	1	A8MCLK	Output	8MCLK2	8192MHz Clock Based on RCLK2
2	G17	2	RCHBLK	Output	RCHBLK2	Receive Channel Block SCT2
2	F17	3	RSYSCLK	Input	RSYSCLK2	Receive System Clock SCT2

2	E17	4	RLOSLOT	Output	RLOS/LOT2	Receive LOS/LOT SCT2
2	D12	5	RSYNC	BiDir	RSYNC2	Receive Sync SCT2
2	--	6	--	Control	--	Internal to Package
2	D17	7	RFSYNC	Output	RFSYNC2	Receive Frame Sync SCT2
2	D16	8	RMSYNC	Output	RMSYNC2	Receive Multiframe Sync SCT2
2	D15	9	RSER	Output	RSER2	Receive Serial Data SCT2
2	B16	10	RSIG	Output	RSIG2	Receive Signaling Output SCT2
2	C15	11	RSIGF	Output	RSIGF2	Receive Signaling Freeze SCT2
2	D14	12	RCHCLK	Output	RCHCLK2	Receive Channel Clock SCT2
2	A16	13	RPOSO	Output	RPOSO2	Receive Positive Data Output SCT2
2	B15	14	RNEGO	Output	RNEGO2	Receive Negative Data Output SCT2
2	C14	15	RCLKO	Output	RCLKO2	Receive Clock Output SCT2
2	A15	16	RCLKI	Input	RCLKI2	Receive Clock Input SCT2
2	D13	17	RNEGI	Input	RNEGI2	Receive Negative Data Input SCT2
2	B14	18	RPOSI	Input	RPOSI2	Receive Positive Data Input SCT2
2	--	19	RDATA	Output	--	Internal to Package
2	B13	20	RCLK	Output	RCLK2	Receive Clock SCT2
2	A12	21	RLCLK	Output	RLCLK2	Receive Link Clock SCT2
2	A13	22	RLINK	Output	RLINK2	Receive Link Data SCT2
2	K3	23	WRRW	Input	<b>Active-Low WR (R/Active-Low W)</b>	Write Input (Read/Write)
2	--	24	FMS	Input	--	Internal to Package
2	A14	25	CS	Input	<b>Active-Low CS2</b>	Chip Select for SCT2
2	N2	26	RDDS	Input	<b>Active-Low RD (Active-Low DS)</b>	Read Input (Data Strobe)
2	P4	27	ALEA7	Input	A7/ALE	Address Bus Bit 7/ALE
2	U8	28	A6	Input	A6	Address Bus Bit 6
2	H4	29	A5	Input	A5	Address Bus Bit 5
2	V8	30	A4	Input	A4	Address Bus Bit 4

2	T4	31	A3	Input	A3	Address Bus Bit 3
2	V2	32	A2	Input	A2	Address Bus Bit 2
2	L17	33	A1	Input	A1	Address Bus Bit 1
2	U3	34	A0	Input	A0	Address Bus Bit 0
2	U4	35	D7AD7	BiDir	D7/AD7	Data or Address/Data Bus Bit 7
2	V4	36	D6AD6	BiDir	D6/AD6	Data or Address/Data Bus Bit 6
2	U5	37	D5AD5	BiDir	D5/AD5	Data or Address/Data Bus Bit 5
2	U9	38	D4AD4	BiDir	D4/AD4	Data or Address/Data Bus Bit 4
2	U7	39	D3AD3	BiDir	D3/AD3	Data or Address/Data Bus Bit 3
2	W15	40	D2AD2	BiDir	D2/AD2	Data or Address/Data Bus Bit 2
2	J19	41	D1AD1	BiDir	D1/AD1	Data or Address/Data Bus Bit 1
2	U11	42	D0AD0	BiDir	D0/AD0	Data or Address/Data Bus Bit 0
2	--	43	--	Control	--	Internal to Package
2	U10	44	MUX	Input	MUX	Mux Bus Select
2	B17	45	CO	Output	CO2	Carry Output for IBO SCT2
2	A18	46	TCHCLK	Output	TCHCLK2	Transmit Channel Clock SCT2
2	B18	47	TSSYNC	Input	TSSYNC2	Transmit System Sync SCT2
2	A19	48	TSYSCLK	Input	TSYSCLK2	Transmit System Clock SCT2
2	--	49	TDATA	Input	--	Internal to Package
2	--	50	TESO	Output	--	Internal to Package
2	C18	51	TSIG	Input	TSIG2	Transmit Signaling Input SCT2
2	C17	52	TSER	Input	TSER2	Transmit Serial Data SCT2
2	B19	53	TCLK	Input	TCLK2	Transmit Clock SCT2
2	C19	54	TPOSO	Output	TPOSO2	Transmit Positive Data Output SCT2
2	B20	55	TNEGO	Output	TNEGO2	Transmit Negative Data Output SCT2
2	E18	56	TCLKO	Output	TCLKO2	Transmit Clock Output SCT2
						Transmit Clock Input

2	D19	57	TCLKI	Input	TCLKI2	SCT2
2	F19	58	TNEGI	Input	TNEGI2	Transmit Negative Data Input SCT2
2	C20	59	TPOSI	Input	TPOSI2	Transmit Positive Data Input SCT2
2	D20	60	TSYNC	BiDir	TSYNC2	Transmit Sync SCT2
2	--	61	--	Control	--	Internal to Package
2	F18	62	CI	Input	CI2	Carry Input for IBO SCT2
2	E19	63	TLINK	Input	TLINK2	Transmit Link Data for SCT2
2	E20	64	TLCLK	Output	TLCLK2	Transmit Link Clock for SCT2
2	F20	65	TCHBLK	Output	TCHBLK2	Transmit Channel Block SCT2
2	U1	66	INT	Output	<b>Active-Low INT</b>	Interrupt
2	--	67	--	Internal	--	Internal to Package
2	--	68	--	Internal	--	Internal to Package
2	U16	69	TEST	Input	TEST	Test
2	--	70	A8XCLK	Output	--	Internal to Package
2	K2	71	LIUC	Input	LIUC	Line Interface Connect
2	P2	72	BTS	Input	BTS	Bus Type Select
3	--	0	RCL	Output	--	Internal to Package
3	F4	1	A8MCLK	Output	8MCLK3	8192 MHz Clock Based on RCLK3
3	G4	2	RCHBLK	Output	RCHBLK3	Receive Channel Block SCT3
3	G3	3	RSYSCLK	Input	RSYSCLK3	Receive System Clock SCT3
3	E1	4	RLOSLOT	Output	RLOS/LOT3	Receive LOS/LOT3 SCT3
3	D1	5	RSYNC	BiDir	RSYNC3	Receive Sync SCT3
3	--	6	--	Control	--	Internal to Package
3	A2	7	RFSYNC	Output	RFSYNC3	Receive Frame Sync SCT3
3	F2	8	RMSYNC	Output	RMSYNC3	Receive Multiframe Sync SCT3
3	E2	9	RSER	Output	RSER3	Receive Serial Data SCT3
3	C1	10	RSIG	Output	RSIG3	Receive Signaling Output SCT3
3	D2	11	RSIGF	Output	RSIGF3	Receive Signaling Freeze SCT3

3	F3	12	RCHCLK	Output	RCHCLK3	Receive Channel Clock SCT3
3	B1	13	RPOSO	Output	RPOSO3	Receive Positive Data Output SCT3
3	C2	14	RNEGO	Output	RNEGO3	Receive Negative Data Output SCT3
3	B4	15	RCLKO	Output	RCLKO3	Receive Clock Output SCT3
3	A4	16	RCLKI	Input	RCLKI3	Receive Clock Input SCT3
3	A1	17	RNEGI	Input	RNEGI3	Receive Negative Data Input SCT3
3	B2	18	RPOSI	Input	RPOSI3	Receive Positive Data Input SCT3
3	--	19	RDATA	Output	--	Internal to Package
3	E3	20	RCLK	Output	RCLK3	Receive Clock SCT3
3	D3	21	RLCLK	Output	RLCLK3	Receive Link Clock SCT3
3	A3	22	RLINK	Output	RLINK3	Receive Link Data SCT3
3	K3	23	WRRW	Input	<b>Active-Low WR (R/Active-Low W)</b>	Write Input (Read/Write)
3	--	24	FMS	Input	--	Internal to Package
3	B5	25	CS	Input	<b>Active-Low CS3</b>	Chip Select for SCT3
3	N2	26	RDDS	Input	<b>Active-Low RD (Active-Low DS)</b>	Read Input (Data Strobe)
3	P4	27	ALEASA7	Input	A7/ALE	Address Bus Bit 7/ALE
3	U8	28	A6	Input	A6	Address Bus Bit 6
3	H4	29	A5	Input	A5	Address Bus Bit 5
3	V8	30	A4	Input	A4	Address Bus Bit 4
3	T4	31	A3	Input	A3	Address Bus Bit 3
3	V2	32	A2	Input	A2	Address Bus Bit 2
3	L17	33	A1	Input	A1	Address Bus Bit 1
3	U3	34	A0	Input	A0	Address Bus Bit 0
3	U4	35	D7AD7	BiDir	D7/AD7	Data or Address/Data Bus Bit 7
3	V4	36	D6AD6	BiDir	D6/AD6	Data or Address/Data Bus Bit 6
3	U5	37	D5AD5	BiDir	D5/AD5	Data or Address/Data Bus Bit 5
3	U9	38	D4AD4	BiDir	D4/AD4	Data or Address/Data Bus Bit 4
3	U7	39	D3AD3	BiDir	D3/AD3	Data or Address/Data Bus Bit 3



3	W15	40	D2AD2	BiDir	D2/AD2	Data or Address/Data Bus Bit 2
3	J19	41	D1AD1	BiDir	D1/AD1	Data or Address/Data Bus Bit 1
3	U11	42	D0AD0	BiDir	D0/AD0	Data or Address/Data Bus Bit 0
3	--	43	--	Control	--	Internal to Package
3	U10	44	MUX	Input	MUX	Mux Bus Select
3	A6	45	CO	Output	CO3	Carry Output for IBO SCT3
3	B8	46	TCHCLK	Output	TCHCLK3	Transmit Channel Clock SCT3
3	D10	47	TSSYNC	Input	TSSYNC3	Transmit System Sync SCT3
3	A11	48	TSYSCLK	Input	TSYSCLK3	Transmit System Clock SCT3
3	--	49	TDATA	Input	--	Internal to Package
3	--	50	TESO	Output	--	Internal to Package
3	A10	51	TSIG	Input	TSIG3	Transmit Signaling Input SCT3
3	C10	52	TSER	Input	TSER3	Transmit Serial Data SCT3
3	B10	53	TCLK	Input	TCLK3	Transmit Clock SCT3
3	C9	54	TPOSO	Output	TPOSO3	Transmit Positive Data Output SCT3
3	D9	55	TNEGO	Output	TNEGO3	Transmit Negative Data Output SCT3
3	A7	56	TCLKO	Output	TCLKO3	Transmit Clock Output SCT3
3	C8	57	TCLKI	Input	TCLKI3	Transmit Clock Input SCT3
3	D8	58	TNEGI	Input	TNEGI3	Transmit Negative Data Input SCT3
3	A8	59	TPOSI	Input	TPOSI3	Transmit Positive Data Input SCT3
3	C7	60	TSYNC	BiDir	TSYNC3	Transmit Sync SCT3
3	--	61	--	Control	--	Internal to Package
3	D7	62	CI	Input	CI3	Carry Input for IBO SCT3
3	C6	63	TLINK	Input	TLINK3	Transmit Link Data for SCT3
3	D6	64	TLCLK	Output	TLCLK3	Transmit Link Clock for SCT3
3	C11	65	TCHBLK	Output	TCHBLK3	Transmit Channel

						Block SCT3
3	U1	66	INT	Output	<b>Active-Low INT</b>	Interrupt for All Four SCTs
3	--	67	--	Internal	--	Internal to Package
3	--	68	--	Internal	--	Internal to Package
3	U16	69	TEST	Input	TEST	Test
3	--	70	A8XCLK	Output	--	Internal to Package
3	K2	71	LIUC	Input	LIUC	Line Interface Connect
3	P2	72	BTS	Input	BTS	Bus Type Select
4	--	0	RCL	Output	--	Internal to Package
4	V13	1	A8MCLK	Output	8MCLK4	8192MHz Clock Based on RCLK4
4	Y12	2	RCHBLK	Output	RCHBLK4	Receive Channel Block SCT4
4	W14	3	RSYSCLK	Input	RSYSCLK4	Receive System Clock SCT4
4	V11	4	RLOSLOT	Output	RLOS/LOT4	Receive LOS/LOT SCT4
4	V12	5	RSYNC	BiDir	RSYNC4	Receive Sync SCT4
4	--	6	--	Control	--	Internal to Package
4	V14	7	RFSYNC	Output	RFSYNC4	Receive Frame Sync SCT4
4	W16	8	RMSYNC	Output	RMSYNC4	Receive Multiframe Sync SCT4
4	W17	9	RSER	Output	RSER4	Receive Serial Data SCT4
4	Y18	10	RSIG	Output	RSIG4	Receive Signaling Output SCT4
4	V16	11	RSIGF	Output	RSIGF4	Receive Signaling Freeze SCT4
4	U14	12	RCHCLK	Output	RCHCLK4	Receive Channel Clock SCT4
4	U15	13	RPOSO	Output	RPOSO4	Receive Positive Data Output SCT4
4	U17	14	RNEGO	Output	RNEGO4	Receive Negative Data Output SCT4
4	T17	15	RCLKO	Output	RCLKO4	Receive Clock Output SCT4
4	R17	16	RCLKI	Input	RCLKI4	Receive Clock Input SCT4
4	P17	17	RNEGI	Input	RNEGI4	Receive Negative Data Input SCT4
4	V15	18	RPOSI	Input	RPOSI4	Receive Positive Data Input SCT4

4	--	19	RDATA	Output	--	Internal to Package
4	M18	20	RCLK	Output	RCLK4	Receive Clock SCT4
4	K18	21	RLCLK	Output	RLCLK4	Receive Link Clock SCT4
4	U12	22	RLINK	Output	RLINK4	Receive Link Data SCT4
4	K3	23	WRRW	Input	<b>Active-Low WR (R/Active-Low W)</b>	Write Input (Read/Write)
4	--	24	FMS	Input	--	Internal to Package
4	K17	25	CS	Input	<b>Active-Low CS4</b>	Chip Select for SCT4
4	N2	26	RDDS	Input	<b>Active-Low RD (Active-Low DS)</b>	Read Input (Data Strobe)
4	P4	27	ALEASA7	Input	A7/ALE	Address Bus Bit 7/ALE
4	U8	28	A6	Input	A6	Address Bus Bit 6
4	H4	29	A5	Input	A5	Address Bus Bit 5
4	V8	30	A4	Input	A4	Address Bus Bit 4
4	T4	31	A3	Input	A3	Address Bus Bit 3
4	V2	32	A2	Input	A2	Address Bus Bit 2
4	L17	33	A1	Input	A1	Address Bus Bit 1
4	U3	34	A0	Input	A0	Address Bus Bit 0
4	U4	35	D7AD7	BiDir	D7/AD7	Data or Address/Data Bus Bit 7
4	V4	36	D6AD6	BiDir	D6/AD6	Data or Address/Data Bus Bit 6
4	U5	37	D5AD5	BiDir	D5/AD5	Data or Address/Data Bus Bit 5
4	U9	38	D4AD4	BiDir	D4/AD4	Data or Address/Data Bus Bit 4
4	U7	39	D3AD3	BiDir	D3/AD3	Data or Address/Data Bus Bit 3
4	W15	40	D2AD2	BiDir	D2/AD2	Data or Address/Data Bus Bit 2
4	J19	41	D1AD1	BiDir	D1/AD1	Data or Address/Data Bus Bit 1
4	U11	42	D0AD0	BiDir	D0/AD0	Data or Address/Data Bus Bit 0
4	--	43	--	Control	--	Internal to Package
4	U10	44	MUX	Input	MUX	Mux Bus Select
4	J20	45	CO	Output	CO4	Carry Output for IBO SCT4
4	L18	46	TCHCLK	Output	TCHCLK4	Transmit Channel Clock SCT4
4	K19	47	TSSYNC	Input	TSSYNC4	Transmit System Sync

						SCT4
4	N18	48	TSYSCLK	Input	TSYSCLK4	Transmit System Clock SCT4
4	--	49	TDATA	Input	--	Internal to Package
4	--	50	TESO	Output	--	Internal to Package
4	L19	51	TSIG	Input	TSIG4	Transmit Signaling Input SCT4
4	K20	52	TSER	Input	TSER4	Transmit Serial Data SCT4
4	M19	53	TCLK	Input	TCLK4	Transmit Clock SCT4
4	N19	54	TPOSO	Output	TPOSO4	Transmit Positive Data Output SCT4
4	N20	55	TNEGO	Output	TNEGO4	Transmit Negative Data Output SCT4
4	P19	56	TCLKO	Output	TCLKO4	Transmit Clock Output SCT4
4	P20	57	TCLKI	Input	TCLKI4	Transmit Clock Input SCT4
4	R20	58	TNEGI	Input	TNEGI4	Transmit Negative Data Input SCT4
4	R19	59	TPOSI	Input	TPOSI4	Transmit Positive Data Input SCT4
4	R18	60	TSYNC	BiDir	TSYNC4	Transmit Sync SCT4
4	--	61	--	Control	--	Internal to Package
4	T20	62	CI	Input	CI4	Carry Input for IBO SCT4
4	T19	63	TLINK	Input	TLINK4	Transmit Link Data for SCT4
4	T18	64	TLCLK	Output	TLCLK4	Transmit Link Clock for SCT4
4	U20	65	TCHBLK	Output	TCHBLK4	Transmit Channel Block SCT4
4	U1	66	INT	Output	<b>Active-Low INT</b>	Interrupt
4	--	67	--	Internal	--	Internal to Package
4	--	68	--	Internal	--	Internal to Package
4	U16	69	TEST	Input	TEST	Test
4	--	70	A8XCLK	Output	--	Internal to Package
4	K2	71	LIUC	Input	LIUC	Line Interface Connect
4	P2	72	BTS	Input	BTS	Bus Type Select

## Related Parts

<a href="#">DS21Q352</a>	Quad T1/E1 Transceiver (3.3V, 5.0V)
<a href="#">DS21Q354</a>	Quad T1/E1 Transceiver (3.3V, 5.0V)
<a href="#">DS21Q55</a>	Quad T1/E1/J1 Transceiver
<a href="#">DS21Q552</a>	Quad T1/E1 Transceiver (3.3V, 5.0V)
<a href="#">DS21Q554</a>	Quad T1/E1 Transceiver (3.3V, 5.0V)

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### More Information

For Technical Support: <http://www.maximintegrated.com/support>

For Samples: <http://www.maximintegrated.com/samples>

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Application Note 406: <http://www.maximintegrated.com/an406>

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