



Z08030/8530

***Serial Communications
Controller***

Customer Procurement Specification

PS011301-0601

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28030/8530 Customer Procurement Spec (CPS)

DC Characteristics	Symbol	Parameter	Min	Max	Unit	Condition
	V_{IH}	Input High Voltage	2.0 ^a	$V_{CC} + 0.3^c$	V	
	V_{IL}	Input Low Voltage	-0.3 ^c	0.8 ^b	V	
	V_{OH}	Output High Voltage	2.4 ^a		V	$I_{OH} = -250 \mu A$
	V_{OL}	Output Low Voltage		0.4 ^a	V	$I_{OL} = +2.0 mA$
	I_{IH}	Input Leakage		$\leq 10.0^a$	μA	$0.4 \leq V_{IH} \leq +2.4V$
	I_{OL}	Output Leakage		$\leq 10.0^a$	μA	$0.4 \leq V_{OL} \leq +2.4V$
	I_{CC}	V_{CC} Supply Current		250	mA	

$V_{CC} = 5V \pm 5\%$ unless otherwise specified, over specified temperature range.

- a Tested
- b Guaranteed by Design
- c Guaranteed by Characterization

Absolute Maximum Ratings

Voltages on all pins with respect to GND -0.3V to +7.0V

Operating Ambient Temperature See Ordering Information

Storage Temperature -65°C to +150°C

Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; operation of the device at any condition above those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Standard Test Conditions

The DC characteristics and capacitance section below apply for the following standard test conditions, unless otherwise noted. All voltages are referenced to GND. Positive current flows into the referenced pin.

Standard conditions are as follows:

- $+4.75V \leq V_{CC} \leq +5.25V$
- GND = 0V
- T_A as specified in Ordering Information

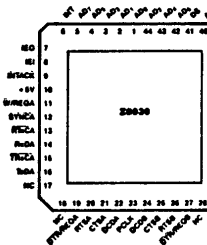
All ac parameters assume a load capacitance of 50 pF max.



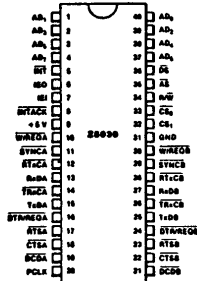
Open-Drain Test Load

Standard Test Load

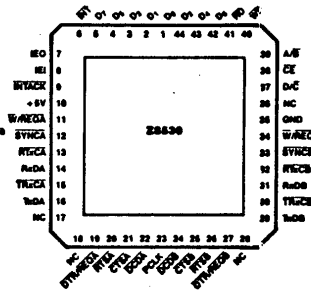
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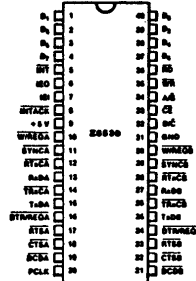
Chip Carrier Pin Assignments, 28030



DIP Pin Assignments, 28030



Chip Carrier Pin Assignments, 28530



DIP Pin Assignments, 28530

General Description

The SCC Serial Communications Controller is a dual-channel, multi-protocol data communications peripheral designed for use with conventional non-multiplexed buses and the Zilog Z-BUS. The SCC functions as a serial-to-parallel-to-serial converter/controller. The SCC can be software-configured to satisfy a wide variety of serial communications applications. The device contains a variety of new, sophisticated internal functions including on-chip baud rate generators, Digital PhaseLocked Loops, and crystal oscillators that dramatically reduce the need for external logic.

The SCC handles asynchronous formats, Synchronous byte-oriented protocols such as IBM Bisync, and Synchronous bit-oriented protocols such as HDLC and IBM SDLC. This versatile device supports virtually any serial data transfer application (cassette, diskette, tape drives, etc.).

The device can generate and check CRC codes in any Synchronous mode and can be programmed to check data integrity in various modes. The SCC also has facilities for modem controls in both channels. In applications where these controls are not needed, the modem controls can be used for general-purpose I/O.

The daisy-chain interrupt hierarchy is also supported—as is standard for Zilog peripheral components.

Maximum data rate: 1/4 PLOCK using external phase lock loop.

Minimum data rate: 80 baud for any PCLK period.

Z8030 AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes*†
			Min	Max	Min	Max	Min	Max	
1	TwAS	AS Low Width	70 ^a		50 ^a		35 ^a		
2	TdDS(AS)	DS ↑ to AS ↓ Delay	50 ^c		25 ^c		15 ^c		
3	TcCS0(AS)	CS ₀ to AS ↑ Setup Time	0 ^a		0 ^a		0 ^a	1	
4	TnCS0(AS)	CS ₀ to AS ↑ Hold Time	80 ^a		40 ^a		30 ^a	1	
5	TcCS1(DS)	CS ₁ to DS ↓ Setup Time	100 ^a		80 ^a		65 ^a	1	
6	TnCS1(DS)	CS ₁ to DS ↓ Hold Time	55 ^c		40 ^c		30 ^c	1	
7	TstA(AS)	INTACK to AS ↑ Setup Time	10 ^c		10 ^c		10 ^c		
8	TnA(AS)	INTACK to AS ↑ Hold Time	250 ^a		200 ^a		150 ^a		
9	TsRW(DS)	R/W (Read) to DS ↓ Setup Time	100 ^a		80 ^a		65 ^a		
10	TnRW(DS)	R/W to DS ↓ Hold Time	55 ^a		40 ^a		35 ^a		
11	TsRW(DS)	R/W (Write) to DS ↓ Setup Time	0 ^c		0 ^c		0 ^c		
12	TdAS(DS)	AS ↑ to DS ↓ Delay	60 ^c		40 ^c		30 ^c		
13	TwDSI	DS Low Width	250 ^a		200 ^a		150 ^a		
14	Tc	Valid Access Recovery Time	4TcPC ^a		4TcPC ^a		4TcPC ^a	2	
15	TstA(AS)	Address to AS ↑ Setup Time	30 ^a		10 ^a		10 ^a	1	
16	TnA(AS)	Address to AS ↑ Hold Time	50 ^a		30 ^a		25 ^a	1	
17	TdW(DS)	Write Data to DS ↓ Setup Time	30 ^a		20 ^a		15 ^a		
18	TnW(DS)	Write Data to DS ↓ Hold Time	30 ^a		20 ^a		20 ^a		
19	TdDS(DA)	DS ↓ to Data Active Delay	0 ^c		0 ^c		0 ^c		
20	TdDS(DR)	DS ↑ to Read Data Not Valid Delay	0 ^a		0 ^a		0 ^a		
21	TdDS(DR)	DS ↓ to Read Data Valid Delay		250 ^a		180 ^a		140 ^a	
22	TdAS(DR)	AS ↑ to Read Data Valid Delay		520 ^a		300 ^a		250 ^a	

NOTES:

- Parameter does not apply to Interrupt Acknowledge transactions.
- Parameter applies only between transactions involving the SCC.
- Timings are preliminary and subject to change.
- Units in nanoseconds (ns).

- a Tested
- b Guaranteed by Design
- c Guaranteed by Characterization

Z8030 AC CHARACTERISTICS (Continued)

Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes*†
			Min	Max	Min	Max	Min	Max	
23	TdDS(DR)	DS ↑ to Read Data Float Delay		70 ^a		40 ^a		40 ^a	3
24	TdAS(DR)	Address Required Valid to Read Data Valid Delay		570 ^a		310 ^a		280 ^a	
25	TdDS(W)	DS ↓ to Wait Valid Delay		240 ^a		200 ^a		170 ^a	4
26	TdDS(REQ)	DS ↓ to R/REQ Not Valid Delay		240 ^a		200 ^a		170 ^a	
27	TdDS(REQ)	DS ↓ to DTR/REQ Not Valid Delay		5TcPC ^a +300 ^a		5TcPC ^a +250 ^a		5TcPC ^a +200 ^a	
28	TdAS(W)	AS ↑ to R/W Valid Delay		600 ^a		500 ^a		500 ^a	4
29	TdAS(DSA)	AS ↑ to DS ↓ (Acknowledge) Delay		250 ^a		250 ^a		250 ^a	5
30	TcDCA	DS (Acknowledge) Low Width		280 ^a		200 ^a		150 ^a	
31	TdDS(DR)	DS ↓ (Acknowledge) to Read Data Valid Delay		250 ^a		180 ^a		140 ^a	
32	TnE(DSA)	DS ↓ to DS ↓ (Acknowledge) Setup Time		120 ^a		100 ^a		80 ^a	
33	TnE(DSA)	DS ↓ to DS ↓ (Acknowledge) Hold Time		0 ^c		0 ^c		0 ^c	
34	TdE(DR)	DS ↓ to DS ↓ Delay		120 ^a		100 ^a		80 ^a	
35	TdE(DR)	DS ↓ to DS ↓ Delay		250 ^a		200 ^a		200 ^a	6
36	TdDS(W)	DS ↓ to R/W Inactive Delay		600 ^a		500 ^a		450 ^a	4
37	TdDS(ASC)	DS ↑ to AS ↓ Delay for No Reset		30 ^a		15 ^a		15 ^a	
38	TdAS(DS)	AS ↑ to DS ↓ Delay for No Reset		30 ^a		30 ^a		30 ^a	
39	TsRES	AS and DS Concordant Low for Reset		250 ^a		200 ^a		150 ^a	7
40	TsPCL	PCLK Low Width		105 ^a		2000 ^a		70 ^a 1000 ^a	50 ^a
41	TsPCLh	PCLK High Width		105 ^a		2000 ^a		70 ^a 1000 ^a	50 ^a
42	TsPC	PCLK Cycle Time		250 ^a		4000 ^a		165 ^a 2000 ^a	120 ^a
43	TsPC	PCLK Rise Time		20 ^a		20 ^a		10 ^a	10 ^a
44	TsPC	PCLK Fall Time		20 ^a		20 ^a		10 ^a	10 ^a

NOTES:

- Fast delay is defined as the time required for a $\pm 0.5V$ change in the output with a maximum dc load and a minimum ac load.
- Open-drain output, measured with open-drain test load.
- Parameter is system dependent. For any Z80CC in the data sheet, TdAS(DSA) must be greater than the sum of TdAS(EQ) for the highest priority device in the data sheet, TdE(DSA) for the Z80CC, and TdE(DR) for each device appearing there in the data sheet.
- Parameter applies only to Z80CC pulling INT Low at the beginning of the Interrupt Acknowledge transaction.
- Measured circuitry shown for the test provided by the Z80 is comprised as a reset by the Z80CC.
- Timings are preliminary and subject to change. All timing references assume 2.0V for a logic "1" and 0.0V for a logic "0".
- Units in nanoseconds (ns).

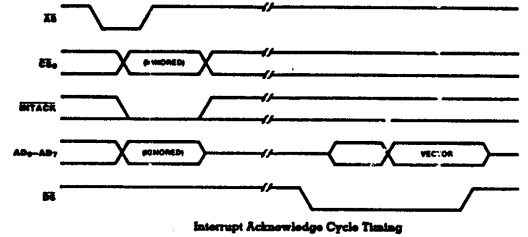
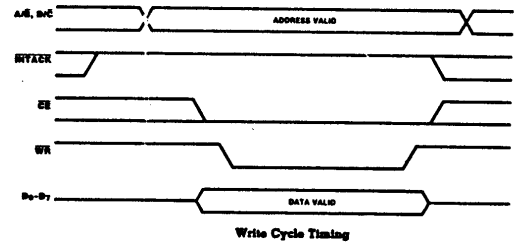
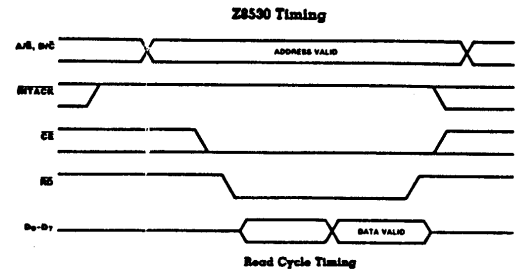
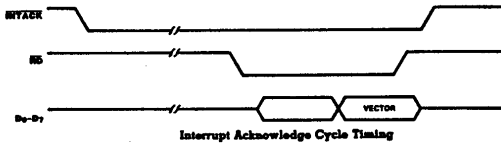
Z8030/Z8030 SYSTEM TIMING AC CHARACTERISTICS

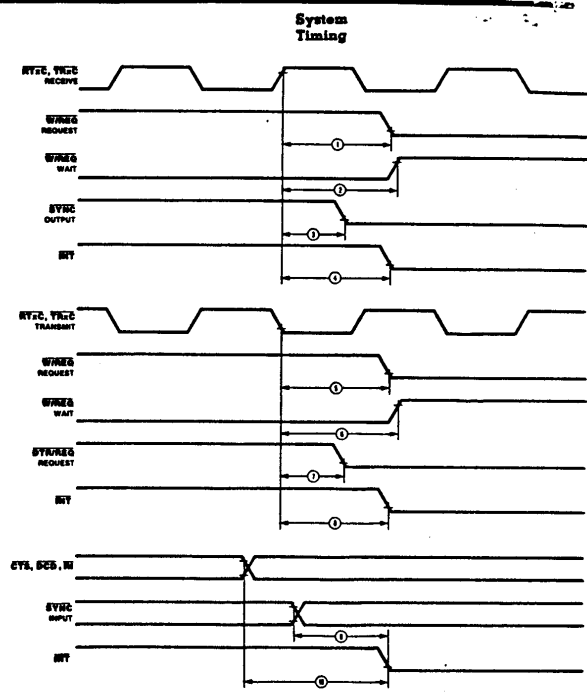
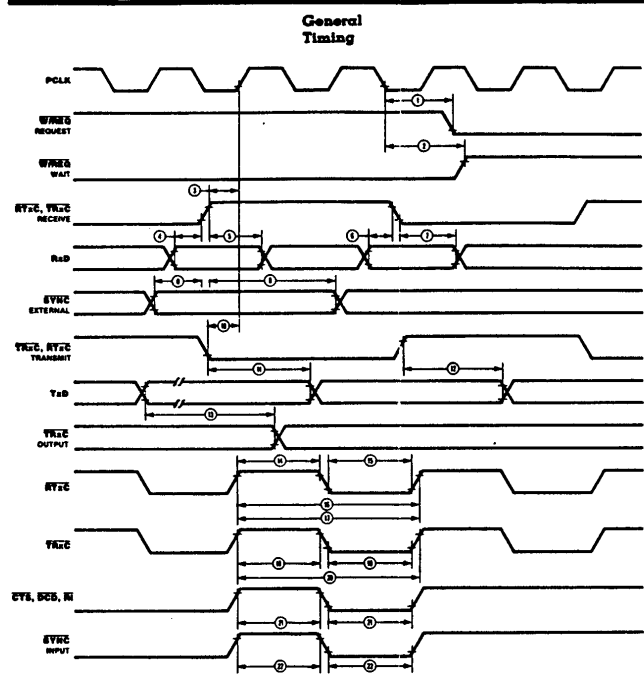
Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes*†
			Min	Max	Min	Max	Min	Max	
1	TdRXC(REQ)	RxC ↑ to W/REQ Valid Delay	8	12	8	12	8	12	2
2	TdRXC(W)	RxC ↑ to Wait Inactive Delay	8	14	8	14	8	14	1,2
3	TdRXC(SY)	RxC ↑ to SYNC Valid Delay	4	7	4	7	4	7	2
4a.	TdRXC(INT), Z8530	RxC ↑ to INT Valid Delay	10	16	10	16	10	16	1,2
4b.	TdRXC(INT), Z8030		8	12	8	12	8	12	1,2
5	TdTXC(REQ)	TxC ↓ to W/REQ Valid Delay	+2	+3	+2	+3	+2	+3	4
6	TdTXC(W)	TxC ↓ to Wait Inactive Delay	5	8	5	8	5	8	3
7	TdTXC(DRO)	TxC ↓ to DTR/REQ Valid Delay	5	11	5	11	5	11	1,3
8a.	TdTXC(DRO)	TxC ↓ to DTR/REQ Valid Delay	4	7	4	7	4	7	3
8a.	TdTXC(INT), Z8530	TxC ↓ to INT Valid Delay	6	10	6	10	6	10	1,3
8b.	TdTXC(INT), Z8030		4	6	4	6	4	6	1,3
9a.	TdSY(INT), Z8530	SYNC Transition to INT Valid Delay	+2	+3	+2	+3	+2	+3	4
9b.	TdSY(INT), Z8030		2	3	2	3	2	3	1,4
10a.	TdEXT(INT), Z8530	DCC or CYS Transition to INT Valid Delay	2	6	2	6	2	6	1
10b.	TdEXT(INT), Z8030		2	3	2	3	2	3	1,4

NOTES:

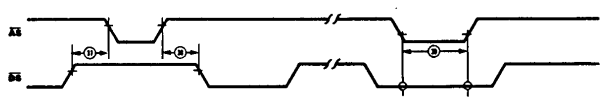
- Open-drain output, measured with open-drain test load.
- RxC is RTxC or TRxC, whichever is supplying the receive clock.
- TxC is TRxC or RTxC, whichever is supplying the transmit clock.
- Units equal to τ_{S} .

*Timings are preliminary and subject to change.
†Units equal to τ_{S} .





Reset Timing
Z8030



Z8530 AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes*†
			Min	Max	Min	Max	Min	Max	
1	TwPCL	PCLK Low Width	105 ^a	2000 ^a	70 ^a	1000 ^a	50 ^a	1000 ^a	
2	TwPCh	PCLK High Width	105 ^a	2000 ^a	70 ^a	1000 ^a	50 ^c	1000 ^a	
3	TfPC	PCLK Fall Time		20 ^a		10 ^a		10 ^a	
4	TfPC	PCLK Rise Time		20 ^a		10 ^a		10 ^a	
5	TcPC	PCLK Cycle Time	250 ^a	4000 ^a	165 ^a	2000 ^a	125 ^a	2000 ^a	
6	TsA(WR)	Address to WR ↓ Setup Time	80 ^a		80 ^a		70 ^a		
7	ThA(WR)	Address to WR ↑ Hold Time	0 ^c		0 ^c		0 ^c		
8	TsA(RD)	Address to RD ↓ Setup Time	80 ^a		80 ^a		70 ^a		
9	ThA(RD)	Address to RD ↑ Hold Time	0 ^c		0 ^c		0 ^c		
10	TsIA(PC)	INTACK to PCLK ↑ Setup Time	10 ^a		10 ^a		10 ^a		
11	TsIA(WR)	INTACK to WR ↓ Setup Time	200 ^a		160 ^a		145 ^a		1
12	ThIA(WR)	INTACK to WR ↑ Hold Time	0 ^c		0 ^c		0 ^c		
13	TsIA(RD)	INTACK to RD ↓ Setup Time	200 ^a		160 ^a		145 ^a		1
14	ThIA(RD)	INTACK to RD ↑ Hold Time	0 ^a		0 ^a		0 ^a		
15	ThIA(PC)	INTACK to PCLK ↑ Hold Time	100 ^a		100 ^a		85 ^a		
16	TsCE(WR)	CE Low to WR ↓ Setup Time	0 ^a		0 ^a		0 ^a		
17	ThCE(WR)	CE to WR ↑ Hold Time	0 ^a		0 ^a		0 ^a		
18	TsCEh(WR)	CE High to WR ↓ Setup Time	100 ^a		70 ^a		60 ^a		
19	TsCE(RD)	CE Low to RD ↓ Setup Time	0 ^a		0 ^a		0 ^a		1
20	ThCE(RD)	CE to RD ↑ Hold Time	0 ^a		0 ^a		0 ^a		1
21	TsCEh(RD)	CE High to RD ↓ Setup Time	100 ^a		70 ^a		60 ^a		1
22	TwRDI	RD Low Width	390 ^a		200 ^a		150 ^a		1
23	TdRD(DRA)	RD ↓ to Read Data Active Delay	0 ^c		0 ^c		0 ^c		
24	TdRD(DR)	RD ↓ to Read Data Not Valid Delay	0 ^a		0 ^a		0 ^a		
25	TdRD(DR)	RD ↓ to Read Data Valid Delay		250 ^a		180 ^a		140 ^a	
26	TdRD(DRz)	RD ↓ to Read Data Float Delay		70 ^a		45 ^a		40 ^a	2

NOTES:
 1. Parameter does not apply to Interrupt Acknowledge transactions.
 2. Float delay is defined as the time required for a ±0.5V change at the output with a maximum dc load and minimum ac load.
 *Timings are preliminary and subject to change.
 †Units in nanoseconds (ns).

Z8530 AC CHARACTERISTICS (Continued)

Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes*†
			Min	Max	Min	Max	Min	Max	
27	TdA(DR)	Address Required Valid to Read Data Valid Delay			300 ^a		280 ^a	220 ^a	
28	TwWR	WR Low Width	240 ^a		200 ^a		150 ^a		
29	ThDW(WR)	Write Data to WR ↓ Setup Time	10 ^a		10 ^a		10 ^a		
30	ThDW(WR)	Write Data to WR ↑ Hold Time	0 ^c		0 ^c		0 ^c		
31	TdWR(W)	WR ↓ to Wait Valid Delay		240 ^a		200 ^a		170 ^a	4
32	TdRD(W)	RD ↓ Wait Valid Delay		240 ^a		200 ^a		170 ^a	4
33	TdWR(REQ)	WR ↓ to W/REQ Not Valid Delay		240 ^a		200 ^a		170 ^a	
34	TdRD(REQ)	RD ↓ to W/REQ Not Valid Delay		240 ^a		200 ^a		170 ^a	
35	TdWR(REQ)	WR ↓ DTR/REQ Not Valid Delay		5TcPC ^a + 300 ^a		5TcPC ^a + 250 ^a		5TcPC ^a + 225 ^a	
36	TdRD(REQ)	RD ↓ to DTR/REQ Not Valid Delay		5TcPC ^a + 300 ^a		5TcPC ^a + 250 ^a		5TcPC ^a + 200 ^a	
37	TdPC(INT)	PCLK ↓ to INT Valid Delay		500 ^a		500 ^a		500 ^a	4
38	TdIA(RD)	INTACK to RD ↓ (Acknowledge) Delay	250 ^a		200 ^a		150 ^a		5
39	TwRDA	RD (Acknowledge) Width	250 ^a		200 ^a		150 ^a		
40	TdRDA(DR)	RD ↓ (Acknowledge) to Read Data Valid Delay		250 ^a		180 ^a		140 ^a	
41	ThE(RDA)	IEI to RD ↓ (Acknowledge) Setup Time	120 ^c		100 ^c		85 ^c		
42	ThE(RDA)	IEI to RD ↓ (Acknowledge) Hold Time	0 ^a		0 ^a		0 ^a		
43	TdE(REQ)	IEI to REQ Delay Time		120 ^c		100 ^c		85 ^c	
44	TdPC(REQ)	PCLK ↓ to REQ Delay		250 ^a		250 ^a		200 ^a	
45	TdRD(INT)	RD ↓ to INT Inactive Delay		500 ^a		500 ^a		450 ^a	4
46	TdRD(WRQ)	RD ↓ to WR ↓ Delay for No Reset	30 ^c		15 ^c		15 ^c		
47	TdWRQ(RD)	WR ↓ to RD ↓ Delay for No Reset	30 ^c		30 ^c		20 ^c		
48	TwRES	WR and RD Inactive Low for Reset	250 ^a		200 ^a		150 ^a		
49	Ttc	Valid Access Recovery Time	4TcPC ^a		4TcPC ^a		4TcPC ^a		3

NOTES:
 3. Parameter applies only between transactions involving the SCC.
 4. Open-drain output, measured with open-drain test load.
 5. Parameter is system dependent. For any SCC in the delay chain, TdIA(RD) must be greater than the sum of TdPC(REQ) for the highest priority valid in the delay chain, TdE(RDA) for the SCC, and ThE(REQ) for each device separating them in the delay chain.
 *Timings are preliminary and subject to change.
 †Units in nanoseconds (ns).

a Tested
 b Guaranteed by Design
 c Guaranteed by Characterization

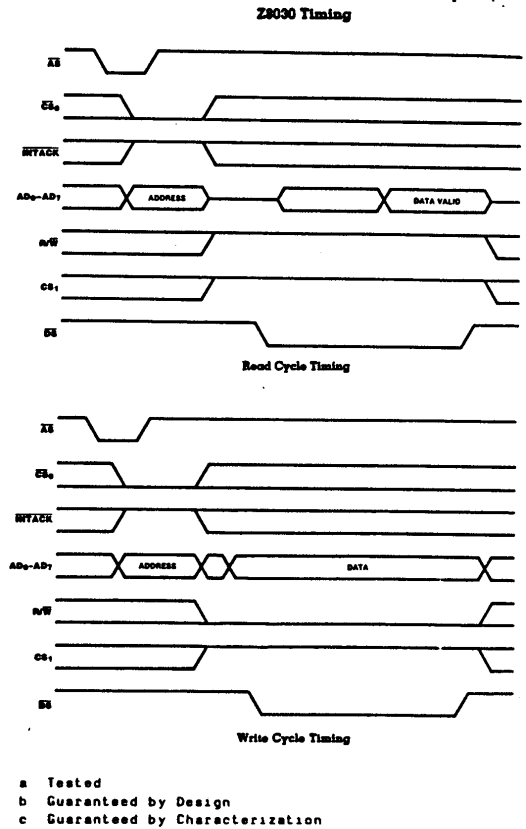
Z8030/Z8530 GENERAL TIMING AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes*†
			Min	Max	Min	Max	Min	Max	
1	TdPC(REQ)	PCLK ↓ to W/REQ Valid Delay		250 ^a		250 ^a		250 ^a	
2	TdPC(W)	PCLK ↓ to Wait Inactive Delay		350 ^a		350 ^a		350 ^a	
3	TsRxC(PC)	RxC ↑ to PCLK ↑ Setup Time (PCLK + 4 case only)		80 TwPCL ^c		70 TwPCL ^c		60 TwPCL ^c	1,4
4	TsRXD(RXC)	RxD to RxC ↑ Setup Time (X1 Mode)		0 ^a		0 ^a		0 ^a	1
5	ThRXD(RXC)	RxD to RxC ↑ Hold Time (X1 Mode)		150 ^a		150 ^a		150 ^a	1
6	TsRXD(RXC)	RxD to RxC ↓ Setup Time (X1 Mode)		0 ^a		0 ^a		0 ^a	1,5
7	ThRXD(RXC)	RxD to RxC ↓ Hold Time (X1 Mode)		150 ^c		150 ^c		150 ^c	1,5
8	TsSY(RXC)	SYNC to RxC ↑ Setup Time		-200 ^a		-200 ^a		-200 ^a	1
9	ThSY(RXC)	SYNC to RxC ↑ Hold Time		3TcPC ^c + 400		3TcPC ^c + 320		3TcPC ^c + 250	1
10	TsTXC(PC)	TxC ↓ to PCLK ↑ Setup Time		0 ^a		0 ^a		0 ^a	2,4
11	TdTXC(TXD)	TxC ↓ to TxD Delay (X1 Mode)		300 ^a		230 ^a		200 ^a	2
12	TdTxCr(TXD)	TxC ↑ to TxD Delay (X1 Mode)		300 ^a		230 ^a		200 ^a	2,5
13	TdTXD(TRX)	TxD to TRxC Delay (Send Clock Echo)		200 ^a		200 ^a		200 ^a	
14	TwRTXh	TRxC High Width		180 ^a		180 ^a		150 ^a	6
15	TwRTXl	TRxC Low Width		180 ^a		180 ^a		150 ^a	6
16	TcRTX	TRxC Cycle Time (RxD, TxD)		1000 ^a		640 ^a		500 ^a	6,7
17	TcRTXX	Crystal Oscillator Period		250 ^c	1000 ^c	165 ^c	1000 ^c	125 ^c	3
18	TwTRXh	TRxC High Width		180 ^a		180 ^a		150 ^a	6
19	TwTRXl	TRxC Low Width		180 ^a		180 ^a		150 ^a	6
20	TcTRX	TRxC Cycle Time		1000 ^a		640 ^a		500 ^a	6,7
21	TwEXT	DCCD or CTS Pulse Width		200 ^a		200 ^a		200 ^a	
22	TwSY	SYNC Pulse Width		200 ^a		200 ^a		200 ^a	

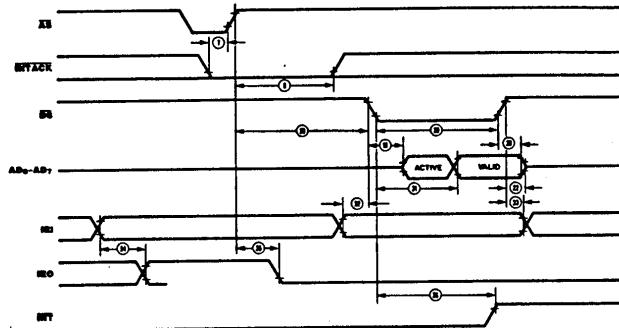
NOTES:

- RxC is RTxC or TRxC, whichever is supplying the receive clock.
- TxC is TRxC or RTxC, whichever is supplying the transmit clock.
- Both RTxC and SYNC have 30 pF capacitors to ground connected to them.
- Parameter applies only if the data rate is one-fourth the PCLK rate. In all other cases, no phase relationship between RxC and PCLK or TxC and PCLK is required.

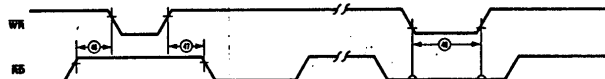
- Parameter applies only to FM encoding/decoding.
- Parameter applies only for transmitter and receiver; DPLL and baud rate generator timing requirements are identical to case PCLK requirements.
- The maximum receive or transmit data is 1/4 PCLK. *Timings are preliminary and subject to change. †Units in nanoseconds (ns).



**Interrupt
Acknowledge
Timing
Z8030**



**Reset
Timing
Z8530**



**Cycle
Timing
Z8530**

