



Z08030/8530

***Serial Communications
Controller***

Customer Procurement Specification

PS011301-0601



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General Description

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 PCLOCK using external phase lock loop.

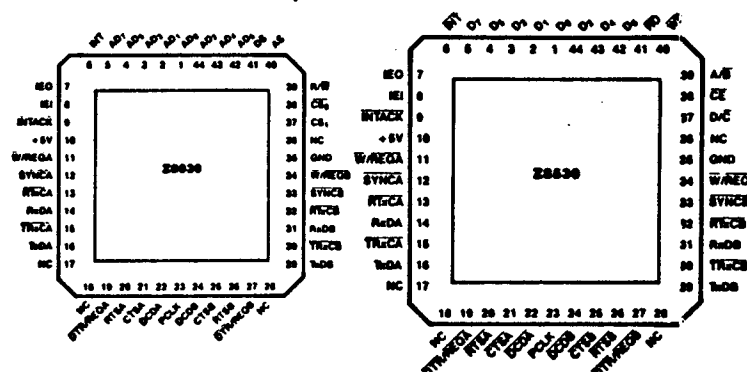
Minimum data rate:
50 baud for any PCLK period.

Box 1 V = 10% unless otherwise marked; any marked temperature range.

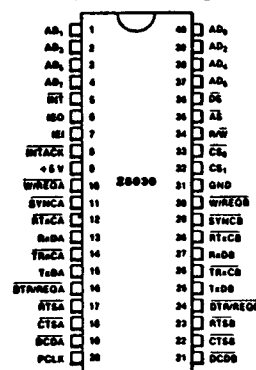
- a Tested
- b Guaranteed by Design
- c Guaranteed by Characterization

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

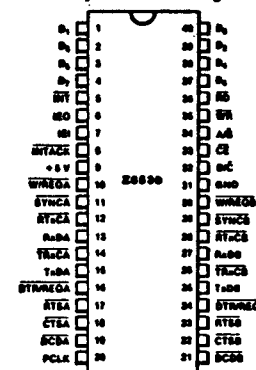
Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; operation of the device at any condition above those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating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



Chile Carrier Pin Assignments, 20030

**DIP Pin Assignments, 28030**

Chin Carrier Pin Assignments: 28530

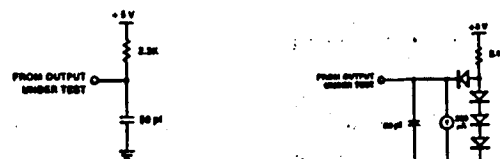


DEP Pin Assignments: Z8530

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:

- $+4.75\text{ V} \leq V_{CC} \leq +5.25\text{ V}$
 - $GND = 0\text{ V}$
 - T_A as specified in Ordering Information
- All ac parameters assume a load capacitance of 50 pF max.



Open-Drain Test Lead

Standard Test Load

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 All specifications (parameters) are subject to change
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 specify which parameters are tested.
 Zilog, Inc. 210 Hacienda Ave., Campbell, CA 95008-6800
 Telephone (408) 376-8000 TUX 010-328-7621

Z8030 AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes [†]
			Min	Max	Min	Max	Min	Max	
1	T _{WAS}	AS Low Width	70 ^a		50 ^a		35 ^a		
2	T _{DS(AS)}	DS ↑ to AS ↓ Delay	50 ^c		25 ^c		15 ^c		
3	T _{CSO(AS)}	CS ₀ to AS ↑ Setup Time	0 ^a		0 ^a		0 ^a		1
4	T _{HCSO(AS)}	CS ₀ to AS ↑ Hold Time	60 ^a		40 ^a		30 ^a		1
5	T _{CS1(DS)}	CS ₁ to DS ↓ Setup Time	100 ^a		80 ^a		65 ^a		1
6	T _{HCS1(DS)}	CS ₁ to DS ↓ Hold Time	55 ^c		40 ^c		30 ^c		1
7	T _{AI(AS)}	INTACK to AS ↑ Setup Time	10 ^c		10 ^c		10 ^c		
8	T _{HA(AS)}	INTACK to AS ↑ Hold Time	250 ^a		200 ^a		150 ^a		
9	T _{RWR(DS)}	R/W (Read) to DS ↓ Setup Time	100 ^a		80 ^a		65 ^a		
10	T _{HRW(DS)}	R/W to DS ↓ Hold Time	55 ^a		40 ^a		35 ^a		
11	T _{RWW(DS)}	R/W (Write) to DS ↓ Setup Time	0 ^c		0 ^c		0 ^c		
12	T _{AS(DS)}	AS ↑ to DS ↓ Delay	60 ^c		40 ^c		30 ^c		
13	T _{WDSI}	DS Low Width	240 ^a		200 ^a		150 ^a		
14	T _{IC}	Valid Access Recovery Time	4T _{CP} ^a		4T _{CP} ^a		4T _{CP} ^a		2
15	T _{SA(AS)}	Address to AS ↑ Setup Time	30 ^a		10 ^a		10 ^a		1
16	T _{HA(AS)}	Address to AS ↑ Hold Time	50 ^a		30 ^a		25 ^a		1
17	T _{SDW(DS)}	Write Data to DS ↓ Setup Time	30 ^a		20 ^a		15 ^a		
18	T _{HDW(DS)}	Write Data to DS ↓ Hold Time	30 ^a		20 ^a		20 ^a		
19	T _{DS(DA)}	DS ↓ to Data Active Delay	0 ^c		0 ^c		0 ^c		
20	T _{DSn(DR)}	DS ↑ to Read Data Not Valid Delay	0 ^a		0 ^a		0 ^a		
21	T _{DSn(DR)}	DS ↓ to Read Data Valid Delay		250 ^a		180 ^a		140 ^a	
22	T _{AS(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	T _{DS(DR)}	DS ↑ to Read Data Float Delay	70 ^a		40 ^a		40 ^c		3
24	T _{ADR}	Address Required Valid to Read Data Valid Delay	570 ^a		510 ^a		380 ^a		
25	T _{DS(W)}	DS ↓ to Wait Valid Delay	240 ^a		200 ^a		170 ^a		4
26	T _{DS(FREQ)}	DS ↓ to WR/EO Not Valid Delay	240 ^a		200 ^a		170 ^a		
27	T _{DS(FREQ)}	DS ↓ to DTR/EO Not Valid Delay	5T _{CP} ^a + 300 ^a		5T _{CP} ^a + 250 ^a		5T _{CP} ^a + 200 ^a		
28	T _{AS(NT)}	AS ↑ to INT Valid Delay	600 ^a		500 ^a		500 ^a		4
29	T _{AS(DSA)}	AS ↑ to DS ↓ (Acknowledge) Delay	250 ^a		250 ^a		250 ^a		5
30	T _{WDA}	DS (Acknowledge) Low Width	280 ^a		200 ^a		160 ^a		
31	T _{DS(DR)}	DS ↓ (Acknowledge) to Read Data Valid Delay	250 ^a		180 ^a		140 ^a		
32	T _{IE(DSA)}	IE ↑ to DS ↓ (Acknowledge) Setup Time	120 ^a		100 ^a		80 ^a		
33	T _{IE(DSA)}	IE ↑ to DS ↓ (Acknowledge) Hold Time	0 ^c		0 ^c		0 ^c		
34	T _{IE(EO)}	IE ↑ to EIO Delay	120 ^a		100 ^a		80 ^a		
35	T _{AS(EO)}	AS ↑ to EIO Delay	280 ^a		250 ^a		200 ^a		6
36	T _{DS(NT)}	DS ↓ (Acknowledge) to INT Inactive Delay	600 ^a		500 ^a		460 ^a		4
37	T _{DS(ASQ)}	DS ↑ to AS ↓ Delay for No Reset	30 ^a		15 ^a		15 ^a		
38	T _{ASQ(DS)}	AS ↑ to DS ↓ Delay for No Reset	30 ^a		30 ^a		30 ^a		
39	T _{WES}	AS and DS Coincident Low for Reset	250 ^a		200 ^a		160 ^a		7
40	T _{PCI}	PCLK Low Width	105 ^a	2000 ^a	70 ^a	1000 ^a	50 ^a		
41	T _{PCn}	PCLK High Width	105 ^a	2000 ^a	70 ^a	1000 ^a	50 ^a		
42	T _{PC}	PCLK Cycle Time	250 ^a	4000 ^a	165 ^a	2000 ^a	125 ^a		
43	T _{PC}	PCLK Rise Time	20 ^a		10 ^a		10 ^a		
44	T _{PC}	PCLK Fall Time	20 ^a		10 ^a		10 ^a		

NOTES

- Float 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 Z80C in the data chain, T_{AS(DSA)} must be greater than the sum of T_{AS(EO)} for the highest priority device in the data chain, T_{IE(DSA)} for the Z80C, and T_{IE(EO)} for each device separating them in the data chain.
- Parameter applies only to a Z80C pulling INT Low at the beginning of the Interrupt Acknowledge transaction.
- Internal circuitry allows for the reset provided by the Z8 to be recognized as a reset by the Z80C.
- Timings are preliminary and subject to change. All timing references assume 2.0V for a logic "1" and 0.5V for a logic "0".
- Units in nanoseconds (ns).

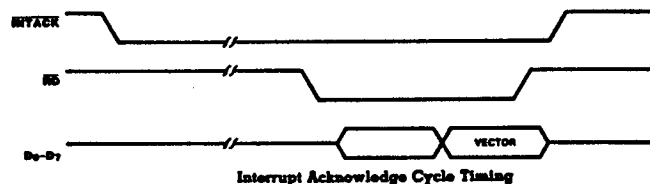
Z8030/Z8530 SYSTEM TIMING AC CHARACTERISTICS

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
			+2	+3	+2	+3	+2	+3	4
5	TdTXC(REQ)	TxC ↓ to W/REQ Valid Delay	5	8	5	8	5	8	3
6	TdTXC(W)	TxC ↓ to Wait Inactive Delay	5	11	5	11	5	11	1,3
7	TdTXC(DRO)	TxC ↓ 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
			+2	+3	+2	+3	+2	+3	4
9a.	TdSY(INT), Z8530	SYNC Transition to INT Valid Delay	2	6	2	6	2	6	1
9b.	TdSY(INT), Z8030		2	3	2	3	2	3	1,4
10a.	TdEXT(INT), Z8530	DCD or CTS Transition to INT Valid Delay	2	6	2	6	2	6	1
10b.	TdEXT(INT), Z8030		2	3	2	3	2	3	1,4

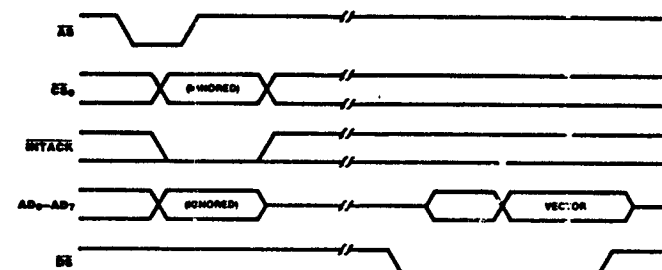
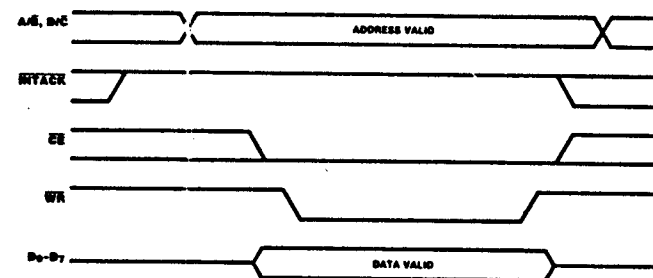
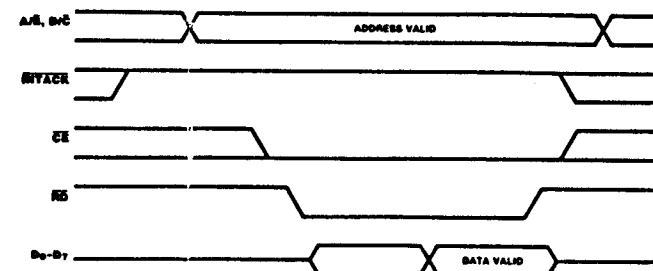
NOTES:

- 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 ΔS .

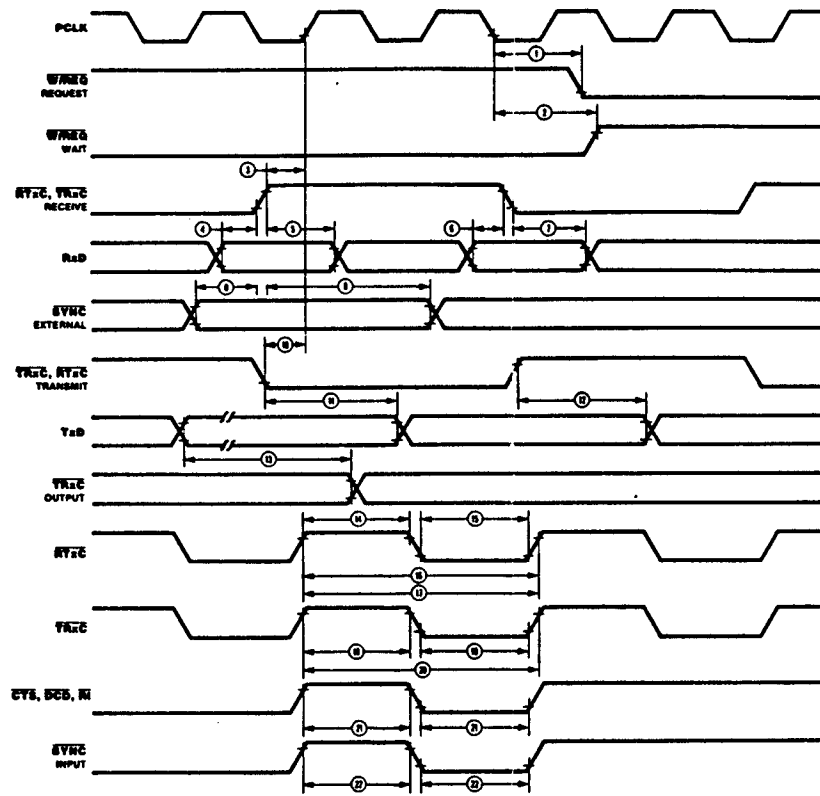
*Timings are preliminary and subject to change.
†Units equal to TdPC.



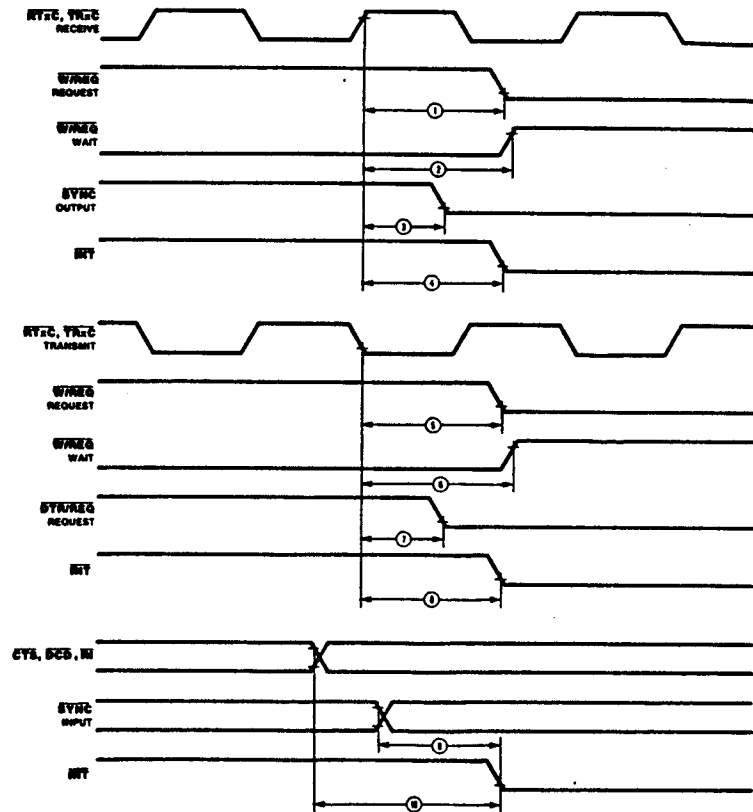
Z8530 Timing



General Timing

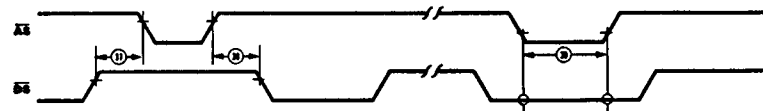


System Timing



Reset Timing

Z8030



Z8530 AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes†
			Min	Max	Min	Max	Min	Max	
1	TwPCI	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	TrPC	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 $\pm 0.5V$ 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	TdWR(WR)	Write Data to WR ↓ Setup Time	10 ^a		10 ^a		10 ^a		
30	ThWR(WR)	Write Data to WR ↑ Hold Time	0 ^c		0 ^c		0 ^c		
31	TdWR(W)	WR ↓ to Wait 't 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 R/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	TsIE(RDA)	IEI to RD ↓ (Acknowledge) Setup Time	120 ^c		100 ^c		95 ^c		
42	ThIE(RDA)	IEI to RD ↑ (Acknowledge) Hold Time	0 ^a		0 ^a		0 ^a		
43	TdIE(IEO)	IEI to IEO Delay Time		120 ^c		100 ^c		95 ^c	
44	TdPC(IEO)	PCLK ↑ to IE ↓ Delay		250 ^a		250 ^a		200 ^a	
45	TdRDA(INT)	RD ↓ to INT Inactive Delay		500 ^c		500 ^c		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 Coincident Low for Reset	250 ^a		200 ^a		150 ^a		
49	Trc	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 data chain, TdIA(RD) must be greater than the sum of TdPC(IEO) for the highest priority device in the data chain, TsIE(RDA) for the SCC, and TdIE(IEO) for each device separating them in the data 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

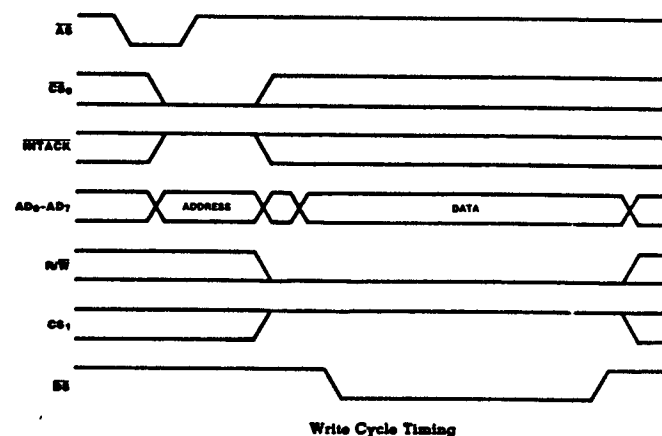
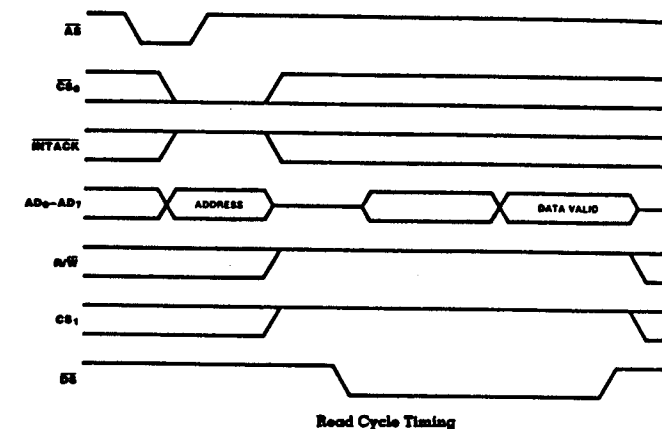
Number	Symbol	Parameter	4 MHz		6 MHz		8 MHz		Notes*†
			Min	Max	Min	Max	Min	Max	
1	TdPC(REQ)	PCLK ↓ to $\overline{W}/\overline{REQ}$ Valid Delay		250 ^a		250 ^a		250 ^a	
2	TdPC(W)	PCLK ↓ to Wait Inactive Delay		350 ^a		350 ^a		350 ^a	
3	TsRXC(PC)	RxC ↑ to PCLK ↑ Setup Time (PCLK + 4 case only)	80	TwPCL ^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 Tx D Delay (X1 Mode)		300 ^a		230 ^a		200 ^a	2
12	TdTxCr(TXD)	TxC ↑ to Tx D 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	TwRTXi	TRxC Low Width	180 ^a		180 ^a		150 ^a		6
16	TcRTX	TRxC Cycle Time (RxD, Tx D)	1000 ^a		640 ^a		500 ^a		6,7
17	TcRTXX	Crystal Oscillator Period	250 ^c	1000 ^c	165 ^c	1000 ^c	125 ^c	1000 ^c	3
18	TwTRXh	TRxC High Width	180 ^a		180 ^a		150 ^a		6
19	TwTRXi	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	DCD or CTS Pulse Width	200 ^a		200 ^a		200 ^a		
22	TwSY	SYNC Pulse Width	200 ^a		200 ^a		200 ^a		

NOTES:

1. RxC is RTxC or TRxC, whichever is supplying the receive clock.
2. Tx C is TRxC or RTxC, whichever is supplying the transmit clock.
3. Both RTxC and SYNC have 30 pF capacitors to ground connected to them.
4. 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 Tx C and PCLK is required.

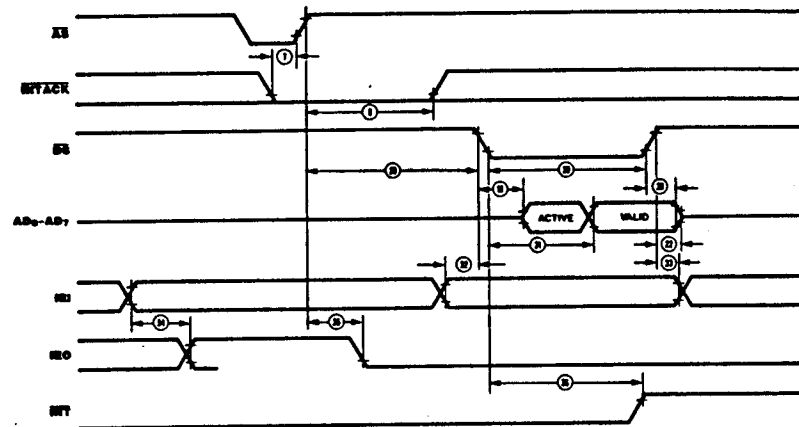
5. Parameter applies only to FM encoding/decoding.
6. Parameter applies only for transmitter and receiver; DPLL and baud rate generator timing requirements are identical to case PCLK requirements.
7. The maximum receive or transmit data is 1/4 PCLK.
*Timings are preliminary and subject to change.
†Units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

Z8030 Timing

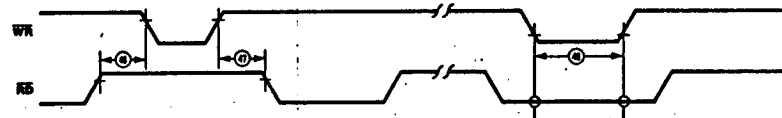


- a Tested
- b Guaranteed by Design
- c Guaranteed by Characterization

**Interrupt
Acknowledge
Timing
Z8030**



**Reset
Timing
Z8530**



**Cycle
Timing
Z8530**

