THE DATASHEET OF

Z0853004PSC

Z08030/8530

Serial Communications Controller

Customer Procurement Specification

PS011301-0601

ZiLOG Worldwide Headquarters • 910 E. Hamilton Avenue • Campbell, CA 95008
Telephone: 408.558.8500 • Fax: 408.558.8300 • www.ZiLOG.com

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ZiLOG Worldwide Headquarters
910 E. Hamilton Avenue
Campbell, CA 95008
Telephone: 408.558.8500
Fax: 408.558.8300
www.ZiLOG.com

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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[a]	V	
V_{OH}	Output High Voltage	2.4[a]		V	I_{OH} = −250 µA
V_{OL}	Output Low Voltage		0.4[a]	V	I_{OL} = +2.0 mA
I_{IL}	Input Leakage		±10.0[a]	µA	$0.4 \le V_{IN} \le +2.4V$
I_{OL}	Output Leakage		±10.0[a]	µA	$0.4 \le V_{OUT} \le +2.4V$
I_{CC}	V_{CC} Supply Current		250	mA	

V_{CC} = 5 V ± 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.

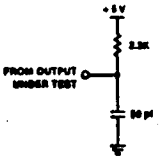
Standard Test Conditions

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.

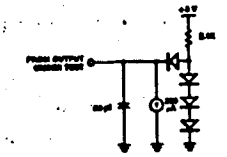
Standard conditions are as follows:

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

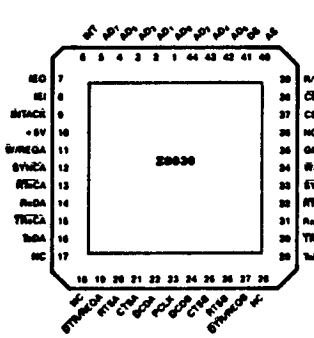
All ac parameters assume a load capacitance of 50 pF max.

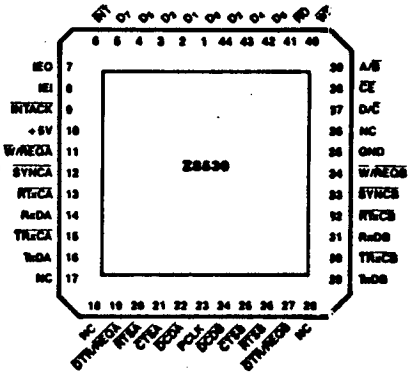


Open-Drain Test Load



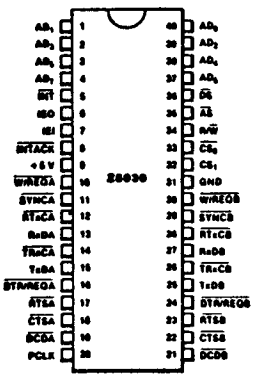
Standard Test Load

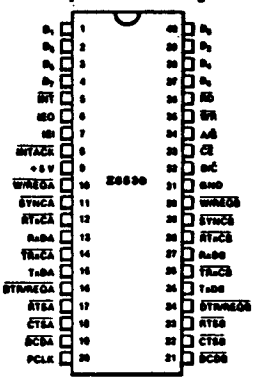




Chip Carrier Pin Assignments. Z8030

Chip Carrier Pin Assignments. Z8530





DIP Pin Assignments. Z8030

DIP Pin Assignments. Z8530

Zilog, Inc. 210 Hacienda Ave., Campbell, CA 95008-6600
Telephone (408) 370-8000 TWX 910-338-7621

00-2837-02

Z8030 AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz Min	4 MHz Max	6 MHz Min	6 MHz Max	8 MHz Min	8 MHz Max	Notes*†
1	TwAS	$\overline{AS}$ Low Width	70[a]		50[a]		35[a]		
2	TdDS(AS)	$\overline{DS}$ ↑ to $\overline{AS}$ ↓ Delay	50[c]		25[c]		15[c]		
3	TsCSO(AS)	$\overline{CS_0}$ to $\overline{AS}$ ↑ Setup Time	0[a]		0[a]		0[a]		1
4	ThCSO(AS)	$\overline{CS_0}$ to $\overline{AS}$ ↑ Hold Time	60[a]		40[a]		30[a]		1
5	TsCS1(DS)	CS_1 to $\overline{DS}$ ↓ Setup Time	100[a]		80[a]		65[a]		1
6	ThCS1(DS)	CS_1 to $\overline{DS}$ ↑ Hold Time	55[c]		40[c]		30[c]		1
7	TsIA(AS)	$\overline{INTACK}$ to $\overline{AS}$ ↑ Setup Time	10[c]		10[c]		10[c]		
8	ThIA(AS)	$\overline{INTACK}$ to $\overline{AS}$ ↑ Hold Time	250[a]		200[a]		150[a]		
9	TsRWR(DS)	R/$\overline{W}$ (Read) to $\overline{DS}$ ↓ Setup Time	100[a]		80[a]		65[a]		
10	ThRW(DS)	R/$\overline{W}$ to $\overline{DS}$ ↑ Hold Time	65[a]		40[a]		35[a]		
11	TsRWW(DS)	R/$\overline{W}$ (Write) to $\overline{DS}$ ↓ Setup Time	0[c]		0[c]		0[c]		
12	TdAS(DS)	$\overline{AS}$ ↑ to $\overline{DS}$ ↓ Delay	60[c]		40[c]		30[c]		
13	TwDSI	$\overline{DS}$ Low Width	240[a]		200[a]		150[a]		
14	TrC	Valid Access Recovery Time	4TcPC[a]		4TcPC[a]		4TcPC[a]		2
15	TsA(AS)	Address to $\overline{AS}$ ↑ Setup Time	30[a]		10[a]		10[a]		1
16	ThA(AS)	Address to $\overline{AS}$ ↑ Hold Time	50[a]		30[a]		25[a]		1
17	TsDW(DS)	Write Data to $\overline{DS}$ ↓ Setup Time	30[a]		20[a]		15[a]		
18	ThDW(DS)	Write Data to $\overline{DS}$ ↑ Hold Time	30[a]		20[a]		20[a]		
19	TdDS(DA)	$\overline{DS}$ ↓ to Data Active Delay	0[c]		0[c]		0[c]		
20	TdDSr(DR)	$\overline{DS}$ ↑ to Read Data Not Valid Delay	0[a]		0[a]		0[a]		
21	TdDSI(DR)	$\overline{DS}$ ↓ to Read Data Valid Delay		250[a]		180[a]		140[a]	
22	TdAS(DR)	$\overline{AS}$ ↑ to Read Data Valid Delay		520[a]		300[a]		250[a]	

NOTES:
1. Parameter does not apply to Interrupt Acknowledge transactions.
2. 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)

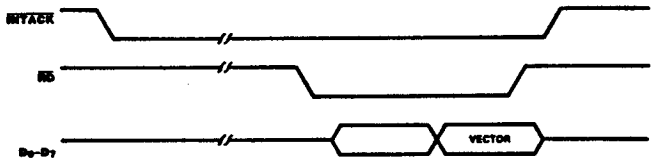
Number	Symbol	Parameter
23	TdDS(DRz)	$\overline{DS}$ ↑ to Read Data Float Delay
24	TdA(DR)	Address Required Valid to Read Data Valid Delay
25	TdDS(W)	$\overline{DS}$ ↓ to Wait Valid Delay
26	TdDS(REQ)	$\overline{DS}$ ↓ to W/$\overline{REQ}$ Not Valid Delay
27	TdDSr(REQ)	$\overline{DS}$ ↓ to DTR/$\overline{REQ}$ Not Valid Delay
28	TdAS(INT)	$\overline{AS}$ ↑ to $\overline{INT}$ Valid Delay
29	TdAS(DSA)	$\overline{AS}$ ↑ to $\overline{DS}$ ↓ (Acknowledge) Delay
30	TwDSA	$\overline{DS}$ (Acknowledge) Low Width
31	TdDSA(DR)	$\overline{DS}$ ↓ (Acknowledge) to Read Data Valid Delay
32	TsIE(DSA)	IEI to $\overline{DS}$ ↓ (Acknowledge) Setup Time
33	ThIE(DSA)	IEI to $\overline{DS}$ ↑ (Acknowledge) Hold Time
34	TdIE(IEO)	IEI to IEO Delay
35	TdAS(IEO)	$\overline{AS}$ ↑ to IEO Delay
36	TdDSA(INT)	$\overline{DS}$ ↓ (Acknowledge) to $\overline{INT}$ Inactive Delay
37	TdDS(ASQ)	$\overline{DS}$ ↑ to $\overline{AS}$ ↓ Delay for No Reset
38	TdASQ(DS)	$\overline{AS}$ ↑ to $\overline{DS}$ ↓ Delay for No Reset
39	TwRES	$\overline{AS}$ and $\overline{DS}$ Coincident Low for Reset
40	TwPCl	PCLK Low Width
41	TwPCh	PCLK High Width
42	TcPC	PCLK Cycle Time
43	TrPC	PCLK Rise Time
44	TfPC	PCLK Fall Time

NOTES
3. Float delay is defined as the time required for a ±0.5V change in the ou
4. Open-drain output, measured with open-drain test load.
5. Parameter is system dependent. For any Z-SCC in the daisy chain, TdAS
device in the daisy chain, TdIE(DSA) for the Z-SCC, and TdIE(IEO) for
6. Parameter applies only to a Z-SCC pulling INT Low at the beginning of
7. Internal circuitry allows for the reset provided by the Z8 to be recognize
*Timings are preliminary and subject to change. All timing references assu
†Units in nanoseconds (ns).

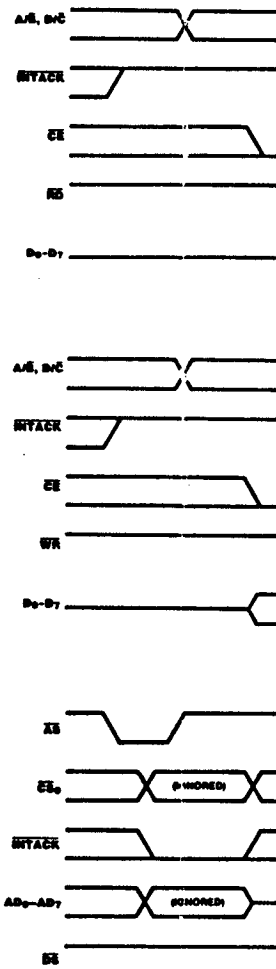
Number	Symbol	Parameter	4 MHz Min	4 MHz Max	6 MHz Min	6 MHz Max	8 MHz Min	8 MHz Max	Notes*†
1	TdRXC(REQ)	RxC ↑ to W/REQ Valid Delay	8	12	8	12	8	12	2
2	TdRXC(W)	RxC ↑ to Wait Inactive Delay	8	14	8	14	8	14	1,2
3	TdRXC(SY)	RxC ↑ to SYNC Valid Delay	4	7	4	7	4	7	2
4a.	TdRXC(INT), Z8530	RxC ↑ to INT Valid 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(DRQ)	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:
1. Open-drain output, measured with open-drain test load.
2. RxC is RTxC or TRxC, whichever is supplying the receive clock.
3. TxC is TRxC or RTxC, whichever is supplying the transmit clock.
4. Units equal to AS.

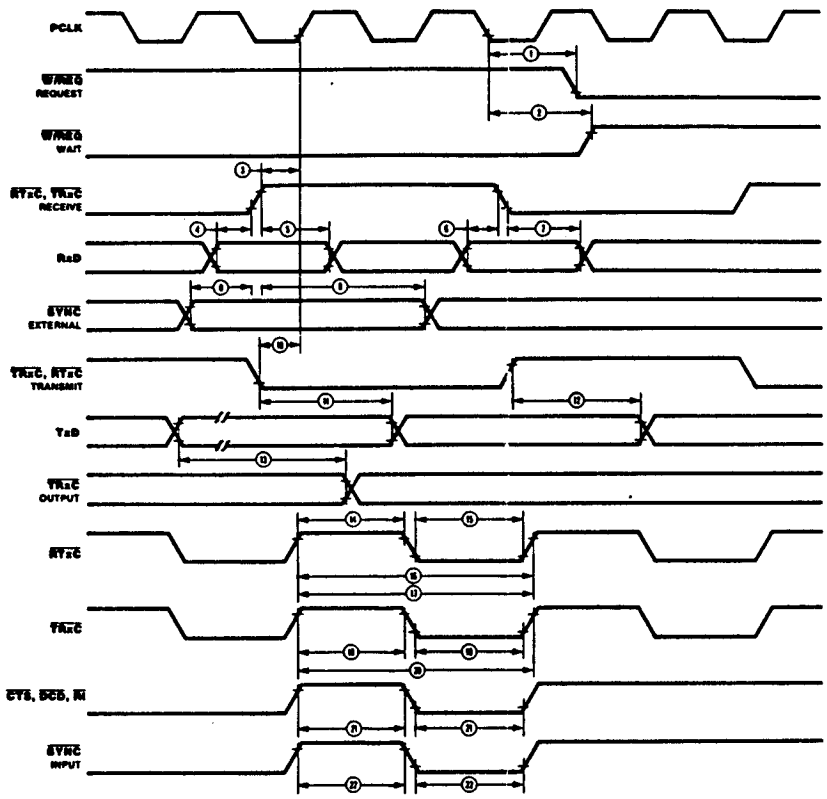
*Timings are preliminary and subject to change.
†Units equal to TcPC.

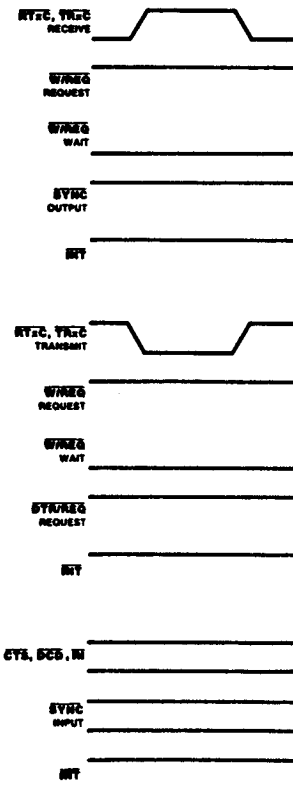


Interrupt Acknowledge Cycle Timing



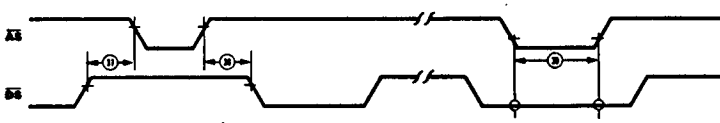
General Timing





Reset Timing

Z8030



Z8530 AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz Min	4 MHz Max	6 MHz Min	6 MHz Max	8 MHz Min	8 MHz Max	Notes*†
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	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 $\overline{WR}$ ↓ Setup Time	80[a]		80[a]		70[a]		
7	ThA(WR)	Address to $\overline{WR}$ ↑ Hold Time	0[c]		0[c]		0[c]		
8	TsA(RD)	Address to $\overline{RD}$ ↓ Setup Time	80[a]		80[a]		70[a]		
9	ThA(RD)	Address to $\overline{RD}$ ↑ Hold Time	0[c]		0[c]		0[c]		
10	TslA(PC)	$\overline{INTACK}$ to PCLK ↑ Setup Time	10[a]		10[a]		10[a]		
11	TslAi(WR)	$\overline{INTACK}$ to $\overline{WR}$ ↓ Setup Time	200[a]		160[a]		145[a]		1
12	ThIA(WR)	$\overline{INTACK}$ to $\overline{WR}$ ↑ Hold Time	0[c]		0[c]		0[c]		
13	TslAi(RD)	$\overline{INTACK}$ to $\overline{RD}$ ↓ Setup Time	200[a]		160[a]		145[a]		1
14	ThIA(RD)	$\overline{INTACK}$ to $\overline{RD}$ ↑ Hold Time	0[a]		0[a]		0[a]		
15	ThIA(PC)	$\overline{INTACK}$ to PCLK ↑ Hold Time	100[a]		100[a]		85[a]		
16	TsCEl(WR)	$\overline{CE}$ Low to $\overline{WR}$ ↓ Setup Time	0[a]		0[a]		0[a]		
17	ThCE(WR)	$\overline{CE}$ to $\overline{WR}$ ↑ Hold Time	0[a]		0[a]		0[a]		
18	TsCEh(WR)	$\overline{CE}$ High to $\overline{WR}$ ↓ Setup Time	100[a]		70[a]		60[a]		
19	TsCEl(RD)	$\overline{CE}$ Low to $\overline{RD}$ ↓ Setup Time	0[a]		0[a]		0[a]		1
20	ThCE(RD)	$\overline{CE}$ to $\overline{RD}$ ↑ Hold Time	0[a]		0[a]		0[a]		1
21	TsCEh(RD)	$\overline{CE}$ High to $\overline{RD}$ ↓ Setup Time	100[a]		70[a]		60[a]		1
22	TwRDl	$\overline{RD}$ Low Width	390[a]		200[a]		150[a]		1
23	TdRD(DRA)	$\overline{RD}$ ↓ to Read Data Active Delay	0[c]		0[c]		0[c]		
24	TdRDr(DR)	$\overline{RD}$ ↑ to Read Data Not Valid Delay	0[a]		0[a]		0[a]		
25	TdRDf(DR)	$\overline{RD}$ ↓ to Read Data Valid Delay		250[a]		180[a]		140[a]	
26	TdRD(DRz)	$\overline{RD}$ ↑ 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 (Continue

Number	Symbol	Parameter
27	TdA(DR)	Address Required Valid to Valid Data
28	TwWRl	$\overline{WR}$ Low Width
29	TsDW(WR)	Write Data to $\overline{WR}$ ↓ Setup T
30	ThDW(WR)	Write Data to $\overline{WR}$ ↑ Hold Ti
31	TdWR(W)	$\overline{WR}$ ↓ to Wait Valid Delay
32	TdRD(W)	$\overline{RD}$ ↓ Wait Valid Delay
33	TdWRl(REQ)	$\overline{WR}$ ↓ to W/$\overline{REQ}$ Not Valid
34	TdRDl(REQ)	$\overline{RD}$ ↓ to W/$\overline{REQ}$ Not Valid
35	TdWRr(REQ)	$\overline{WR}$ ↓ DTR/$\overline{REQ}$ Not Valid
36	TdRDr(REQ)	$\overline{RD}$ ↑ to DTR/$\overline{REQ}$ Not Vali
37	TdPC(INT)	PCLK ↓ to $\overline{INT}$ Valid Delay
38	TdIA(RD)	$\overline{INTACK}$ to $\overline{RD}$ ↓ (Acknowl
39	TwRDA	$\overline{RD}$ (Acknowledge) Width
40	TdRDA(DR)	$\overline{RD}$ ↓ (Acknowledge) to Re Valid Data
41	TslEI(RDA)	IEI to $\overline{RD}$ ↓ (Acknowledge) Time
42	ThIEI(RDA)	IEI to $\overline{RD}$ ↑ (Acknowledge)
43	TdIEI(IEO)	IEI to IEO Delay Time
44	TdPC(IEO)	PCLK ↑ to IEO Delay
45	TdRDA(INT)	$\overline{RD}$ ↓ to $\overline{INT}$ Inactive Delay
46	TdRD(WRQ)	$\overline{RD}$ ↑ to $\overline{WR}$ ↓ Delay for No
47	TdWRQ(RD)	$\overline{WR}$ ↑ to $\overline{RD}$ ↓ Delay for No
48	TwRES	$\overline{WR}$ and $\overline{RD}$ Coincident Lo
49	Trc	Valid Access Recovery Ti

NOTES:
3. Parameter applies only between transactions involving th
4. Open-drain output, measured with open-drain test load.
5. Parameter is system dependent. For any RCC in the dais vice in the daisy chain, TslEI(RDA) for the SCC, and TdIE
*Timings are preliminary and subject to change.
†Units in nanoseconds (ns).

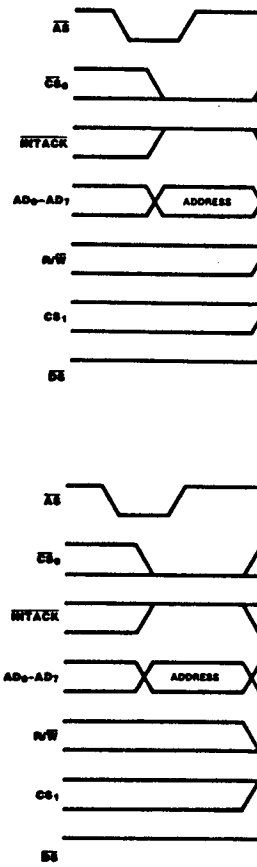
a Tested
b Guaranteed by Design
c Guaranteed by Characteri

Z8030/Z8530 GENERAL TIMING AC CHARACTERISTICS

Number	Symbol	Parameter	4 MHz Min	4 MHz Max	6 MHz Min	6 MHz Max	8 MHz Min	8 MHz Max	Notes*†
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(RXCr)	RxD to RxC ↑ Setup Time (X1 Mode)	0[a]		0[a]		0[a]		1
5	ThRXD(RXCr)	RxD to RxC ↑ Hold Time (X1 Mode)	150[a]		150[a]		150[a]		1
6	TsRXD(RXCf)	RxD to RxC ↓ Setup Time (X1 Mode)	0[a]		0[a]		0[a]		1,5
7	ThRXD(RXCf)	RxD to RxC ↓ Hold Time (X1 Mode)	150[c]		150[c]		150[a]		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	TdTXCf(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	RTxC High Width	180[a]		180[a]		150[a]		6
15	TwRTXl	RTxC Low Width	180[a]		180[a]		150[a]		6
16	TcRTX	RTxC 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]	1000[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	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. TxC 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 TxC 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 ¼ PCLK.

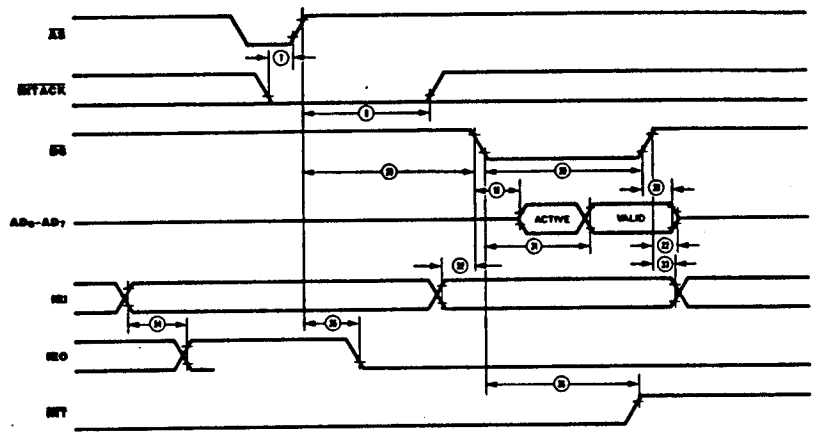
*Timings are preliminary and subject to change.
†Units in nanoseconds (ns).



a Tested
b Guaranteed by Des
c Guaranteed by Cha

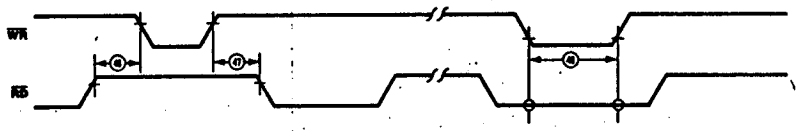
Interrupt Acknowledge Timing

Z8030



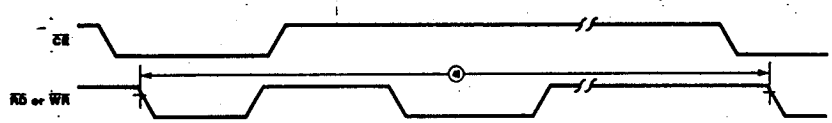
Reset Timing

Z8530



Cycle Timing

Z8530



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