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"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

### Applications of "[Embedded - Microcontrollers](#)"

#### Details

Product Status	Active
Core Processor	Z8
Core Size	8-Bit
Speed	12MHz
Connectivity	-
Peripherals	POR, WDT
Number of I/O	14
Program Memory Size	2KB (2K x 8)
Program Memory Type	OTP
EEPROM Size	-
RAM Size	125 x 8
Voltage - Supply (Vcc/Vdd)	4.5V ~ 5.5V
Data Converters	-
Oscillator Type	Internal
Operating Temperature	-40°C ~ 105°C (TA)
Mounting Type	Surface Mount
Package / Case	18-SOIC (0.295", 7.50mm Width)
Supplier Device Package	-
Purchase URL	<a href="https://www.e-xfl.com/product-detail/zilog/z86e0812seg1903">https://www.e-xfl.com/product-detail/zilog/z86e0812seg1903</a>

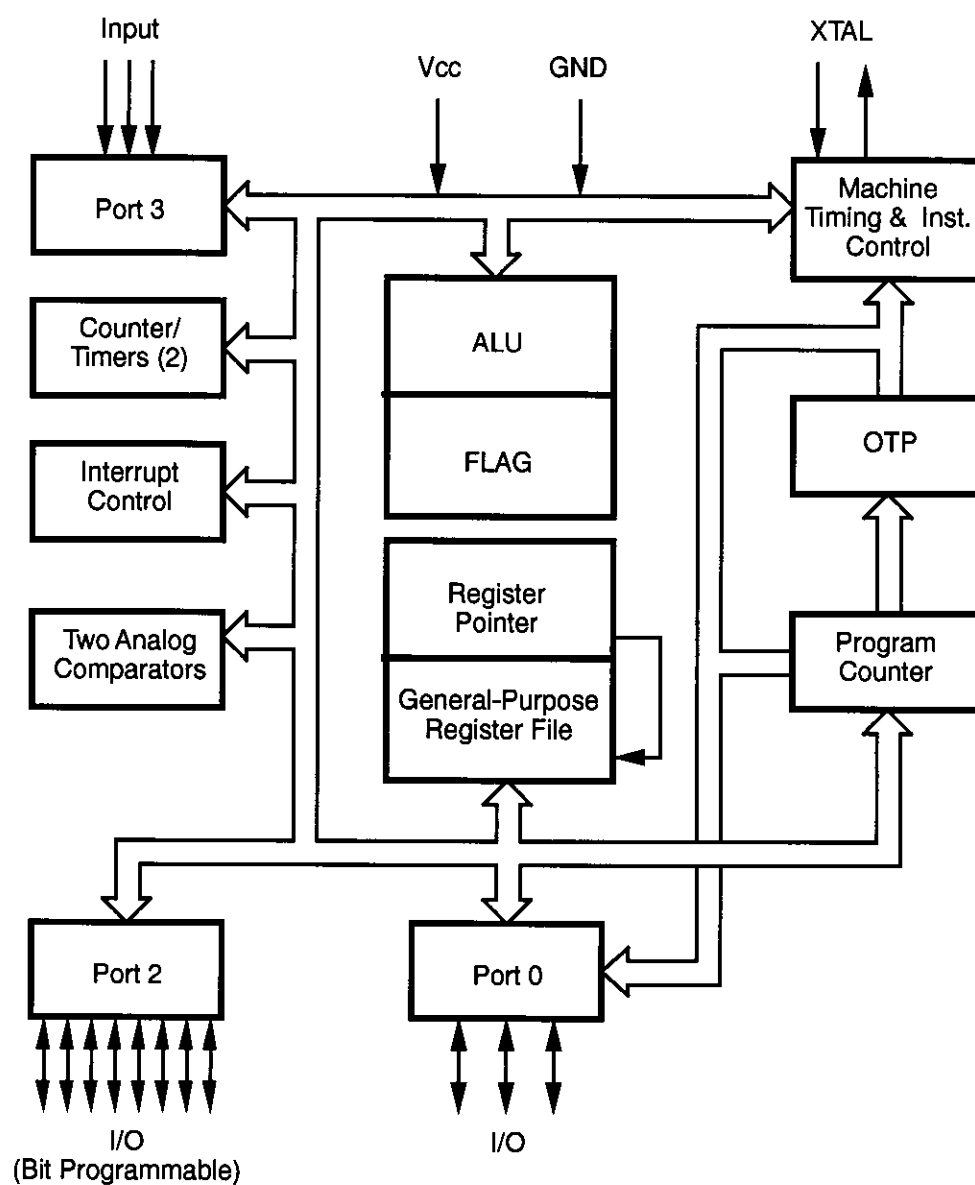


Figure 1. Functional Block Diagram

# GENERAL DESCRIPTION (Continued)

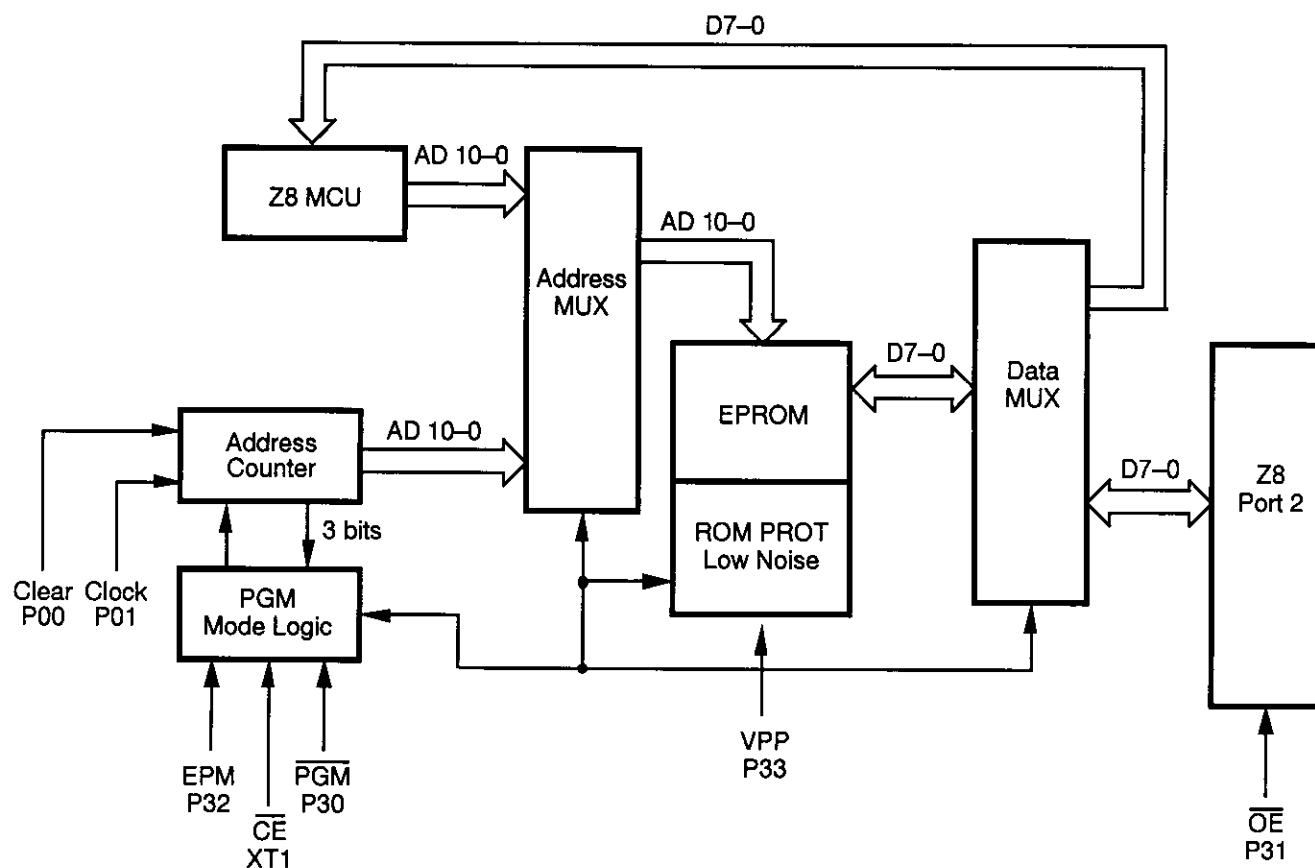


Figure 2. EPROM Programming Mode Block Diagram

## PIN DESCRIPTION

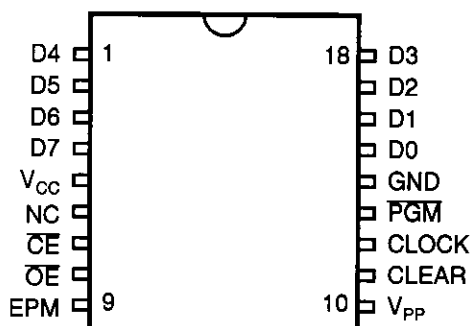


Figure 3. 18-Pin EPROM Mode Configuration

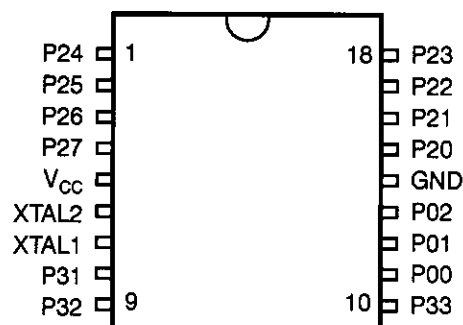


Figure 4. 18-Pin DIP/SOIC Mode Configuration

Table 1. 18-Pin DIP Pin Identification

EPROM Programming Mode			
Pin #	Symbol	Function	Direction
1–4	D4–D7	Data 4, 5, 6, 7	In/Output
5	V <sub>CC</sub>	Power Supply	
6	NC	No Connection	
7	CE	Chip Enable	Input
8	OE	Output Enable	Input
9	EPM	EPROM Prog Mode	Input
10	V <sub>PP</sub>	Prog Voltage	Input
11	Clear	Clear Clock	Input
12	Clock	Address	Input
13	PGM	Prog Mode	Input
14	GND	Ground	
15–18	D0–D3	Data 0,1, 2, 3	In/Output

Table 2. 18-Pin DIP/SOIC Pin Identification

Standard Mode			
Pin #	Symbol	Function	Direction
1–4	P24–P27	Port 2, Pins 4,5,6,7	In/Output
5	V <sub>CC</sub>	Power Supply	
6	XTAL2	Crystal Osc. Clock	Output
7	XTAL1	Crystal Osc. Clock	Input
8	P31	Port 3, Pin 1, AN1	Input
9	P32	Port 3, Pin 2, AN2	Input
10	P33	Port 3, Pin 3, REF	Input
11–13	P00–P02	Port 0, Pins 0,1,2	In/Output
14	GND	Ground	
15–18	P20–P23	Port 2, Pins 0,1,2,3	In/Output

**ABSOLUTE MAXIMUM RATINGS**

Stresses greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional 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 an extended period may affect device reliability. Total power

dissipation should not exceed 462 mW for the package. Power dissipation is calculated as follows:

$$\begin{aligned} \text{Total Power Dissipation} = & V_{DD} \times [I_{DD} - (\text{sum of } I_{OH})] \\ & + \text{sum of } [(V_{DD} - V_{OH}) \times I_{OH}] \\ & + \text{sum of } (V_{OL} \times I_{OL}) \end{aligned}$$

Parameter	Min	Max	Units	Note
Ambient Temperature under Bias	-40	+105	C	
Storage Temperature	-65	+150	C	
Voltage on any Pin with Respect to $V_{SS}$	-0.7	+12	V	1
Voltage on $V_{DD}$ Pin with Respect to $V_{SS}$	-0.3	+7	V	
Voltage on Pins 7, 8, 9, 10 with Respect to $V_{SS}$	-0.6	$V_{DD}+1$	V	2
Total Power Dissipation		1.65	W	
Maximum Allowable Current out of $V_{SS}$		300	mA	
Maximum Allowable Current into $V_{DD}$		220	mA	
Maximum Allowable Current into an Input Pin	-600	+600	$\mu\text{A}$	3
Maximum Allowable Current into an Open-Drain Pin	-600	+600	$\mu\text{A}$	4
Maximum Allowable Output Current Sunked by Any I/O Pin		25	mA	
Maximum Allowable Output Current Sourced by Any I/O Pin		25	mA	
Total Maximum Output Current Sunked by a Port		60	mA	
Total Maximum Output Current Sourced by a Port		45	mA	

**Notes:**

1. This applies to all pins except where otherwise noted. Maximum current into pin must be  $\pm 600 \mu\text{A}$ .
2. There is no input protection diode from pin to  $V_{DD}$  (not applicable to EPROM Mode).
3. This excludes Pin 6 and Pin 7.
4. Device pin is not at an output Low state.

**DC ELECTRICAL CHARACTERISTICS**

Standard Temperature

Sym	Parameter	$V_{CC}$ [4]	$T_A = 0^\circ\text{C to } +70^\circ\text{C}$		Typical @ 25°C	Units	Conditions	Notes
			Min	Max				
$V_{INMAX}$	Max Input Voltage	4.5V		12		V	$I_{in} < 250 \mu\text{A}$	1
		5.5V		12		V	$I_{in} < 250 \mu\text{A}$	1
$V_{CH}$	Clock Input High Voltage	4.5V	$0.8 V_{CC}$	$V_{CC}+0.3$	2.8	V	Driven by External Clock Generator	
		5.5V	$0.8 V_{CC}$	$V_{CC}+0.3$	2.8	V	Driven by External Clock Generator	
$V_{CL}$	Clock Input Low Voltage	4.5V	$V_{SS}-0.3$	$0.2 V_{CC}$	1.7	V	Driven by External Clock Generator	
		5.5V	$V_{SS}-0.3$	$0.2 V_{CC}$	1.7	V	Driven by External Clock Generator	
$V_{IH}$	Input High Voltage	4.5V	$0.7 V_{CC}$	$V_{CC}+0.3$	2.8	V		
		5.5V	$0.7 V_{CC}$	$V_{CC}+0.3$	2.8	V		
$V_{IL}$	Input Low Voltage	4.5V	$V_{SS}-0.3$	$0.2 V_{CC}$	1.5	V		
		5.5V	$V_{SS}-0.3$	$0.2 V_{CC}$	1.5	V		
$V_{OH}$	Output High Voltage	4.5V	$V_{CC}-0.4$		4.8	V	$I_{OH} = -2.0 \text{ mA}$	5
		5.5V	$V_{CC}-0.4$		4.8	V	$I_{OH} = -2.0 \text{ mA}$	5
		4.5V	$V_{CC}-0.4$		4.8	V	Low Noise @ $I_{OH} = -0.5 \text{ mA}$	
		5.5V	$V_{CC}-0.4$		4.8	V	Low Noise @ $I_{OH} = -0.5 \text{ mA}$	
$V_{OL1}$	Output Low Voltage	4.5V		0.8	0.1	V	$I_{OL} = +4.0 \text{ mA}$	5
		5.5V		0.4	0.1	V	$I_{OL} = +4.0 \text{ mA}$	5
		4.5V		0.4	0.1	V	Low Noise @ $I_{OL} = 1.0 \text{ mA}$	
		5.5V		0.4	0.1	V	Low Noise @ $I_{OL} = 1.0 \text{ mA}$	
$V_{OL2}$	Output Low Voltage	4.5V		0.8	0.8	V	$I_{OL} = +12 \text{ mA}$ ,	5
		5.5V		0.8	0.8	V	$I_{OL} = +12 \text{ mA}$ ,	5
$V_{OFFSET}$	Comparator Input Offset Voltage	4.5V		25.0	10.0	mV		
		5.5V		25.0	10.0	mV		
$V_{LV}$	$V_{CC}$ Low Voltage Auto Reset		2.2	3.0	2.8	V	@ 6 MHz Max. Int. CLK Freq.	
$I_{IL}$	Input Leakage (Input Bias Current of Comparator)	4.5V	-1.0	1.0		$\mu\text{A}$	$V_{IN} = 0\text{V}, V_{CC}$	
		5.5V	-1.0	1.0		$\mu\text{A}$	$V_{IN} = 0\text{V}, V_{CC}$	
$I_{OL}$	Output Leakage	4.5V	-1.0	1.0		$\mu\text{A}$	$V_{IN} = 0\text{V}, V_{CC}$	
		5.5V	-1.0	1.0		$\mu\text{A}$	$V_{IN} = 0\text{V}, V_{CC}$	
$V_{ICR}$	Comparator Input Common Mode Voltage Range		0	$V_{CC}-1.0$		V		

## DC ELECTRICAL CHARACTERISTICS (Continued)

Sym	Parameter	V <sub>CC</sub> [4]	T <sub>A</sub> = 0°C to +70°C		Typical @ 25°C	Units	Conditions	Notes
			Min	Max				
I <sub>CC1</sub>	Standby Current (Low Noise Mode)	4.5V		4.0	2.5	mA	HALT Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> @ 1 MHz	7
		5.5V		4.0	2.5	mA	HALT Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> @ 1 MHz	7
		4.5V		4.5	2.8	mA	HALT Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> @ 2 MHz	7
		5.5V		4.5	2.8	mA	HALT Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> @ 2 MHz	7
		4.5V		5.0	3.0	mA	HALT Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> @ 4 MHz	7
		5.5V		5.0	3.0	mA	HALT Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> @ 4 MHz	7
I <sub>CC2</sub>	Standby Current	4.5V		10.0	1.0	μA	STOP Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> WDT is not Running	7,8
		5.5V		10.0	1.0	μA	STOP Mode V <sub>IN</sub> = 0V, V <sub>CC</sub> WDT is not Running	7,8
I <sub>ALL</sub>	Auto Latch Low Current	4.5V		32.0	16	μA	0V < V <sub>IN</sub> < V <sub>CC</sub>	
		5.5V		32.0	16	μA	0V < V <sub>IN</sub> < V <sub>CC</sub>	
I <sub>ALH</sub>	Auto Latch High Current	4.5V		-16.0	-8.0	μA	0V < V <sub>IN</sub> < V <sub>CC</sub>	
		5.5V		-16.0	-8.0	μA	0V < V <sub>IN</sub> < V <sub>CC</sub>	

## Notes:

- Port 2 and Port 0 only
- V<sub>SS</sub> = 0V = GND
- The device operates down to V<sub>LV</sub> of the specified frequency for V<sub>LV</sub>. The minimum operational V<sub>CC</sub> is determined on the value of the voltage V<sub>LV</sub> at the ambient temperature. The V<sub>LV</sub> increases as the temperature decreases.
- V<sub>CC</sub> = 4.5 to 5.5V, typical values measured at V<sub>CC</sub> = 5.0V.  
The V<sub>CC</sub> voltage specification of 5.5 V guarantees 5.0 V ± 0.5V with typical values measured at V<sub>CC</sub> = 5.0V.
- Standard Mode (not Low EMI Mode)
- Z86E08 only
- All outputs unloaded and all inputs are at V<sub>CC</sub> or V<sub>SS</sub> level.
- If analog comparator is selected, then the comparator inputs must be at V<sub>CC</sub> level.

**AC ELECTRICAL CHARACTERISTICS**

Timing Table (Standard Mode for SCLK/TCLK = XTAL/2)

Standard Temperature

15		$T_A = 0\text{ }^{\circ}\text{C to } +70\text{ }^{\circ}\text{C}$							
No	Symbol	Parameter	$V_{CC}$	8 MHz		12 MHz		Units	Notes
				Min	Max	Min	Max		
1	TpC	Input Clock Period	4.5V	125	DC	83	DC	ns	1
			5.5V	125	DC	83	DC	ns	1
2	TrC,TfC	Clock Input Rise and Fall Times	4.5V		25		15	ns	1
			5.5V		25		15	ns	1
3	TwC	Input Clock Width	4.5V	62		41		ns	1
			5.5V	62		41		ns	1
4	TwTinL	Timer Input Low Width	4.5V	100		100		ns	1
			5.5V	70		70		ns	1
5	TwTinH	Timer Input High Width	4.5V	5TpC		5TpC			1
			5.5V	5TpC		5TpC			1
6	TpTin	Timer Input Period	4.5V		8TpC	8TpC			1
			5.5V		8TpC	8TpC			1
7	TrTin, TtTin	Timer Input Rise and Fall Time	4.5V		100		100	ns	1
			5.5V		100		100	ns	1
8	TwIL	Int. Request Input Low Time	4.5V	70		70		ns	1,2
			5.5V	70		70		ns	1,2
9	TwIH	Int. Request Input High Time	4.5V		5TpC	5TpC			1,2
			5.5V		5TpC	5TpC			1,2
10	Twdt	Watch-Dog Timer Delay Time for Timeout	4.5V	12		12		ms	1
			5.5V	12		12		ms	1
11	Tpor	Power-On Reset Time	4.5V	20	80	20	80	ms	1
			5.5V	20	80	20	80	ms	1

**Notes:**

1. Timing Reference uses 0.7  $V_{CC}$  for a logic 1 and 0.2  $V_{CC}$  for a logic 0.
2. Interrupt request through Port 3 (P33–P31).



# AC ELECTRICAL CHARACTERISTICS (Continued)

Low Noise Mode, Extended Temperature

No	Symbol	Parameter	V <sub>CC</sub>	T <sub>A</sub> = −40 °C to +105 °C				Units	Notes
				1 MHz		4 MHz			
				Min	Max	Min	Max		
1	TPC	Input Clock Period	4.5V	1000	DC	250	DC	ns	1
			5.5V	1000	DC	250	DC	ns	1
2	TrC TfC	Clock Input Rise and Fall Times	4.5V	25		25		ns	1
			5.5V	25		25		ns	1
3	TwC	Input Clock Width	4.5V	500		125		ns	1
			5.5V	500		125		ns	1
4.	TwTinL	Timer Input Low Width	4.5V	70		70		ns	1
			5.5V	70		70		ns	1
5	TwTinH	Timer Input High Width	4.5V	2.5TpC		2.5TpC			1
			5.5V	2.5TpC		2.5TpC			1
6	TpTin	Timer Input Period	4.5V	4TpC		4TpC			1
			5.5V	4TpC		4TpC			1
7	TrTin, TtTin	Timer Input Rise and Fall Time	4.5V	100		100		ns	1
			5.5V	100		100		ns	1
8	TwIL	Int. Request Input Low Time	4.5V	70		70		ns	1,2
			5.5V	70		70		ns	1,2
9	TwIH	Int. Request Input High Time	4.5V	2.5TpC		2.5TpC			1,2
			5.5V	2.5TpC		2.5TpC			1,2
10	Twdt	Watch-Dog Timer Delay Time for Timeout	4.5V	10		10		ms	1
			5.5V	10		10		ms	1

## Notes:

1. Timing Reference uses 0.7 V<sub>CC</sub> for a logic 1 and 0.2 V<sub>CC</sub> for a logic 0.
2. Interrupt request through Port 3 (P33–P31).

**Port 2, P27–P20.** Port 2 is an 8-bit, bit programmable, bi-directional, Schmitt-triggered CMOS-compatible I/O port. These eight I/O lines can be configured under software

control to be inputs or outputs, independently. Bits programmed as outputs can be globally programmed as either push-pull or open-drain (Figure 8).

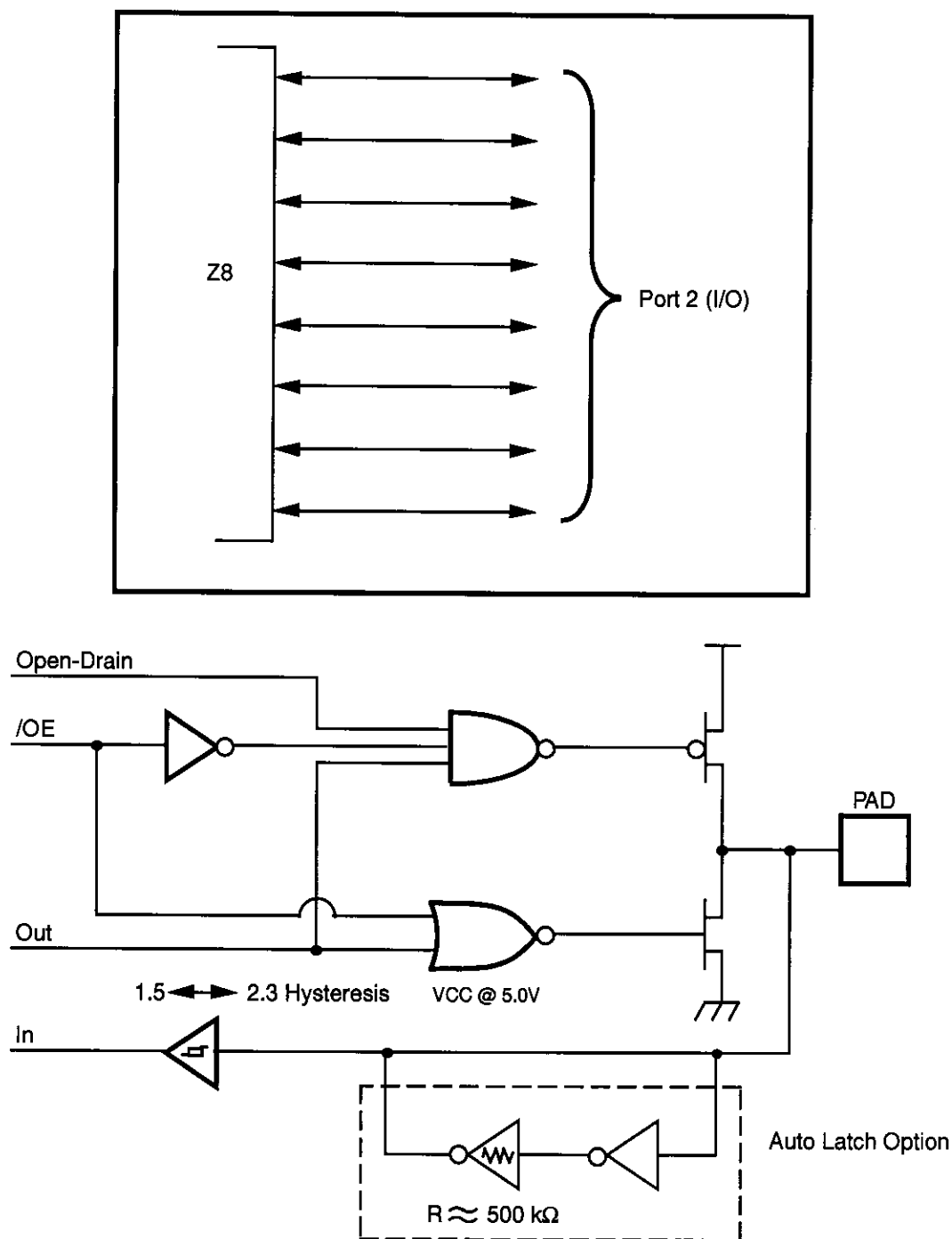


Figure 8. Port 2 Configuration

## FUNCTIONAL DESCRIPTION (Continued)

**Interrupts.** The Z8 has six interrupts from six different sources. These interrupts are maskable and prioritized (Figure 15). The sources are divided as follows: the falling edge of P31 (AN1), P32 (AN2), P33 (REF), the rising edge of P32 (AN2), and two counter/timers. The Interrupt Mask Register globally or individually enables or disables the six interrupt requests (Table 4).

When more than one interrupt is pending, priorities are resolved by a programmable priority encoder that is controlled by the Interrupt Priority register. All Z8 interrupts are vectored through locations in program memory. When an Interrupt machine cycle is activated, an Interrupt Request is granted. This disables all subsequent interrupts, saves the Program Counter and Status Flags, and then branches to the program memory vector location reserved for that interrupt. This memory location and the next byte contain the 16-bit starting address of the interrupt service routine for that particular interrupt request.

To accommodate polled interrupt systems, interrupt inputs are masked and the interrupt request register is polled to determine which of the interrupt requests needs service.

**Note:** User must select any Z86E08 mode in Zilog's C12 ICEBOX™ emulator. The rising edge interrupt is not supported on the CCP emulator (a hardware/software workaround must be employed).

Table 4. Interrupt Types, Sources, and Vectors

Name	Source	Vector Location	Comments
IRQ0	AN2(P32)	0,1	External (F)Edge
IRQ1	REF(P33)	2,3	External (F)Edge
IRQ2	AN1(P31)	4,5	External (F)Edge
IRQ3	AN2(P32)	6,7	External (R)Edge
IRQ4	T0	8,9	Internal
IRQ5	T1	10,11	Internal

**Notes:**

F = Falling edge triggered

R = Rising edge triggered

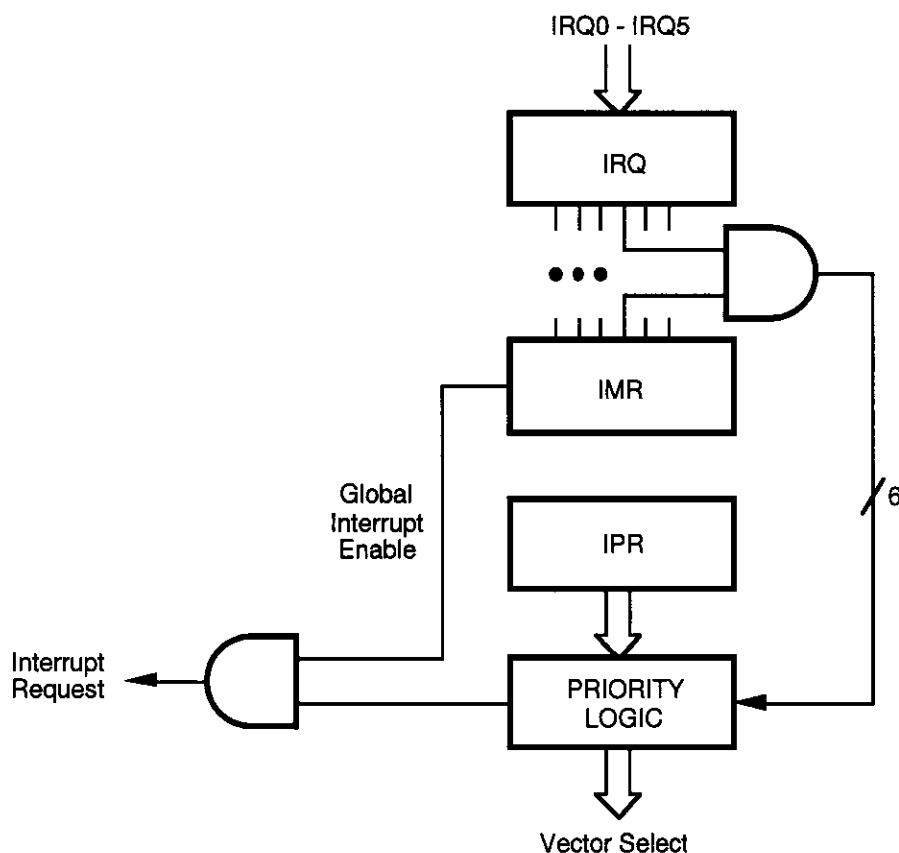
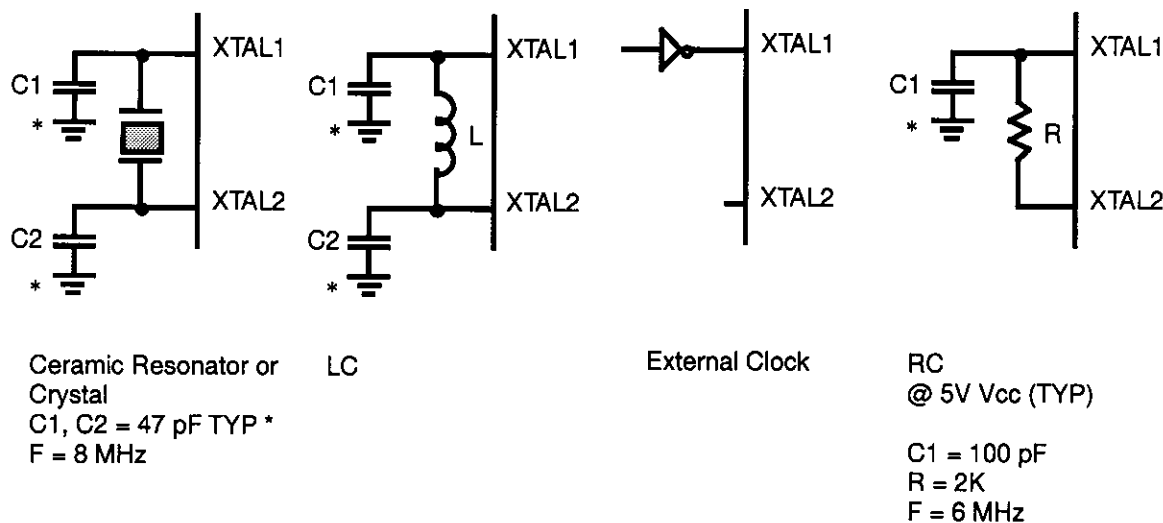


Figure 15. Interrupt Block Diagram

**Clock.** The Z8 on-chip oscillator has a high-gain, parallel-resonant amplifier for connection to a crystal, LC, RC, ceramic resonator, or any suitable external clock source (XTAL1 = INPUT, XTAL2 = OUTPUT). The crystal should be AT cut, up to 12 MHz max., with a series resistance (RS) of less than or equal to 100 Ohms.

The crystal should be connected across XTAL1 and XTAL2 using the vendors crystal recommended capacitors from each pin directly to device ground pin 14 (Figure 16). Note that the crystal capacitor loads should be connected to V<sub>SS</sub>, Pin 14 to reduce Ground noise injection.



\* Typical value including pin parasitics

**Figure 16. Oscillator Configuration**

## FUNCTIONAL DESCRIPTION (Continued)

Table 5. Typical Frequency vs. RC Values  
 $V_{CC} = 5.0V @ 25^{\circ}C$ 

Resistor (R)	Load Capacitor							
	33 pFd		56 pFd		100 pFd		0.00 1 $\mu$ Fd	
	A(Hz)	B(Hz)	A(Hz)	B(Hz)	A(Hz)	B(Hz)	A(Hz)	B(Hz)
1.0M	33K	31K	20K	20K	12K	11K	1.4K	1.4K
560K	56K	52K	34K	32K	20K	19K	2.5K	2.4K
220K	144K	130K	84K	78K	48K	45K	6K	6K
100K	315K	270K	182K	164K	100K	95K	12K	12K
56K	552K	480K	330K	300K	185K	170K	23K	22K
20K	1.4M	1M	884K	740K	500K	450K	65K	61K
10K	2.6M	2M	1.6M	1.3M	980K	820K	130K	123K
5K	4.4M	3M	2.8M	2M	1.7K	1.3M	245K	225K
2K	8M	5M	6M	4M	3.8K	2.7M	600K	536K
1K	12M	7M	8.8M	6M	6.3K	4.2M	1.0M	950K

## Notes:

A = STD Mode Frequency.

B = Low EMI Mode Frequency.

Table 6. Typical Frequency vs. RC Values  
 $V_{CC} = 3.3V @ 25^{\circ}C$ 

Resistor (R)	Load Capacitor							
	33 pFd		56 pFd		100 pFd		0.00 1 $\mu$ Fd	
	A(Hz)	B(Hz)	A(Hz)	B(Hz)	A(Hz)	B(Hz)	A(Hz)	B(Hz)
1.0M	18K	18K	12K	12K	7.4K	7.7K	1K	1K
560K	30K	30K	20K	20K	12K	12K	1.6K	1.6K
220K	70K	70K	47K	47K	30K	30K	4K	4K
100K	150K	148K	97K	96K	60K	60K	8K	8K
56K	268K	250K	176K	170K	100K	100K	15K	15K
20K	690M	600K	463K	416K	286K	266K	40K	40K
10K	1.2M	1M	860K	730K	540K	480K	80K	76K
5K	2M	1.7M	1.5M	1.2M	950K	820K	151K	138K
2K	4.6M	3M	3.3M	2.4M	2.2M	1.6M	360K	316K
1K	7M	4.6M	5M	3.6M	3.6K	2.6M	660K	565K

## Notes:

A = STD Mode Frequency.

B = Low EMI Mode Frequency.

## Low EMI Emission

The Z8 can be programmed to operate in a low EMI Emission (Low Noise) Mode by means of an EPROM programmable bit option. Use of this feature results in:

- Less than 1 mA consumed during HALT Mode.
- All drivers slew rates reduced to 10 ns (typical).
- Internal SCLK/TCLK = XTAL operation limited to a maximum of 4 MHz–250 ns cycle time.
- Output drivers have resistances of 500 ohms (typical).
- Oscillator divide-by-two circuitry eliminated.

In addition to  $V_{DD}$  and GND ( $V_{SS}$ ), the Z8 changes all its pin functions in the EPROM Mode. XTAL2 has no function, XTAL1 functions as  $\overline{CE}$ , P31 functions as  $\overline{OE}$ , P32 functions as EPM, P33 functions as  $V_{PP}$ , and P02 functions as PGM.

**ROM Protect.** ROM Protect fully protects the Z8 ROM code from being read externally. When ROM Protect is selected, the instructions LDC and LDCI are supported (Z86E04/E08 and Z86C04/C08 do not support the instructions of LDE and LDEI). When the device is programmed for ROM Protect, the Low Noise feature will not automatically be enabled.

Please note that when using the device in a noisy environment, it is suggested that the voltages on the EPM and  $\overline{CE}$  pins be clamped to  $V_{CC}$  through a diode to  $V_{CC}$  to prevent accidentally entering the OTP Mode. The  $V_{PP}$  requires both a diode and a 100 pF capacitor.

**Auto Latch Disable.** Auto Latch Disable option bit when programmed will globally disable all Auto Latches.

**WDT Enable.** The WDT Enable option bit, when programmed, will have the hardware enabled Permanent WDT enabled after exiting reset and can not be stopped in Halt or Stop Mode.

**EPROM/Test Mode Disable.** The EPROM/Test Mode Disable option bit, when programmed, will disable the EPROM Mode and the Factory Test Mode. Reading, verifying, and programming the Z8 will be disabled. To fully verify that this mode is disabled, the device must be power cycled.

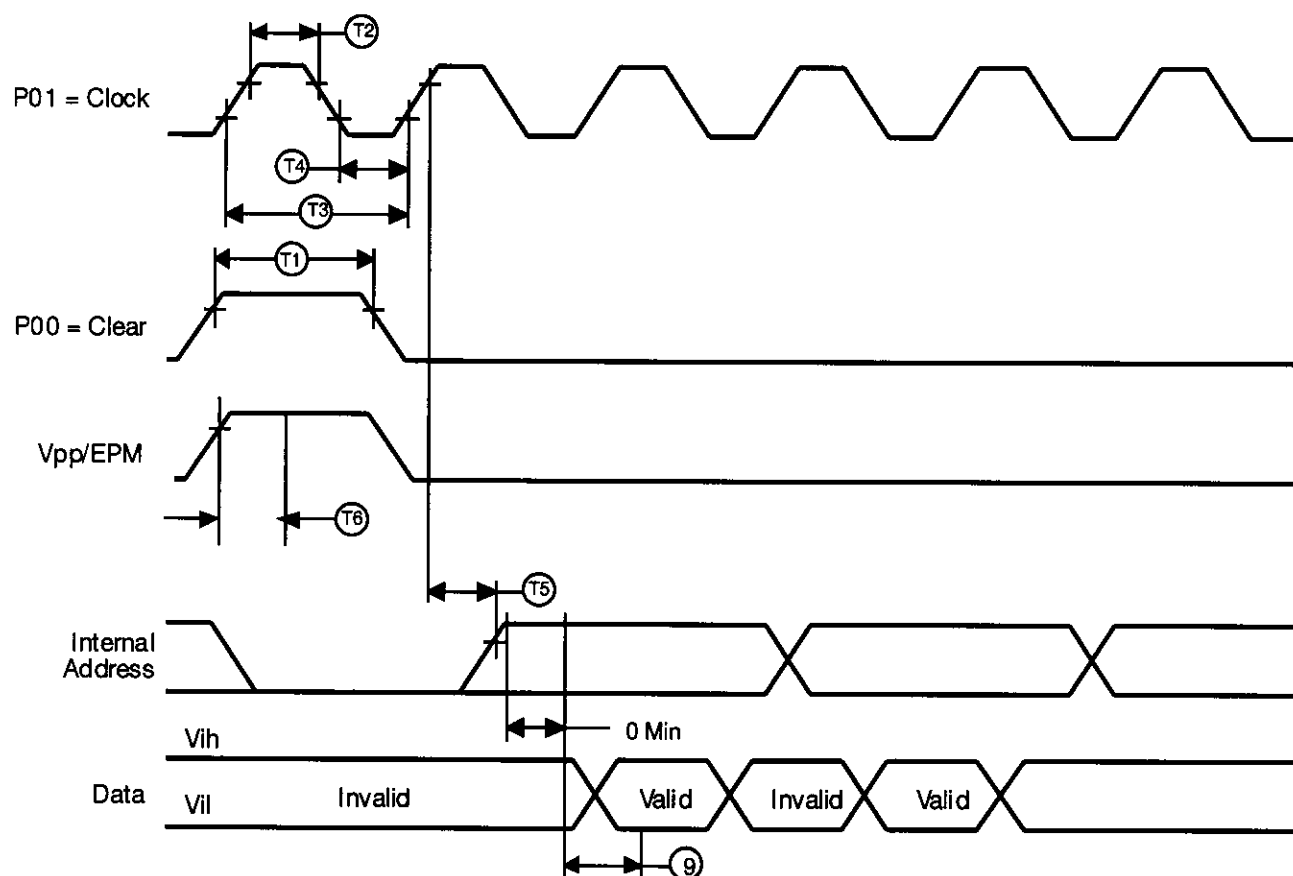
**User Modes.** Table 7 shows the programming voltage of each mode.

Table 7. OTP Programming Table

Programming Modes	$V_{PP}$	EPM	$\overline{CE}$	$\overline{OE}$	PGM	ADDR	DATA	$V_{CC}^*$
EPROM READ	NU	$V_H$	$V_{IL}$	$V_{IL}$	$V_{IH}$	ADDR	Out	5.0V
PROGRAM	$V_H$	$V_{IH}$	$V_{IL}$	$V_{IH}$	$V_{IL}$	ADDR	In	6.4V
PROGRAM VERIFY	$V_H$	$V_{IH}$	$V_{IL}$	$V_{IL}$	$V_{IH}$	ADDR	Out	6.4V
EPROM PROTECT	$V_H$	$V_H$	$V_H$	$V_{IH}$	$V_{IL}$	NU	NU	6.4V
LOW NOISE SELECT	$V_H$	$V_{IH}$	$V_H$	$V_{IH}$	$V_{IL}$	NU	NU	6.4V
AUTO LATCH DISABLE	$V_H$	$V_{IH}$	$V_H$	$V_{IL}$	$V_{IL}$	NU	NU	6.4V
WDT ENABLE	$V_H$	$V_{IL}$	$V_H$	$V_{IH}$	$V_{IL}$	NU	NU	6.4V
EPROM/TEST MODE	$V_H$	$V_{IL}$	$V_H$	$V_{IL}$	$V_{IL}$	NU	NU	6.4V

### Notes:

1.  $V_H = 12.75V \pm 0.25 V_{DC}$ .
2.  $V_{IH}$  = As per specific Z8 DC specification.
3.  $V_{IL}$  = As per specific Z8 DC specification.
4. X = Not used, but must be set to  $V_H$  or  $V_{IH}$  level.
5. NU = Not used, but must be set to either  $V_{IH}$  or  $V_{IL}$  level.
6.  $I_{PP}$  during programming = 40 mA maximum.
7.  $I_{CC}$  during programming, verify, or read = 40 mA maximum.
8. \*  $V_{CC}$  has a tolerance of  $\pm 0.25V$ .



Legend:	
T1 Reset Clock Width	30 ns Min
T2 Input Clock High	100 ns Min
T3 Input Clock Period	200 ns Min
T4 Input Clock Low	100 ns Min
T5 Clock to Address Counter Out Delay	15 ns Max
T6 Epm/Vpp Set up Time	40 $\mu$ s Min

Figure 18. Z86E04/E08 Address Counter Waveform

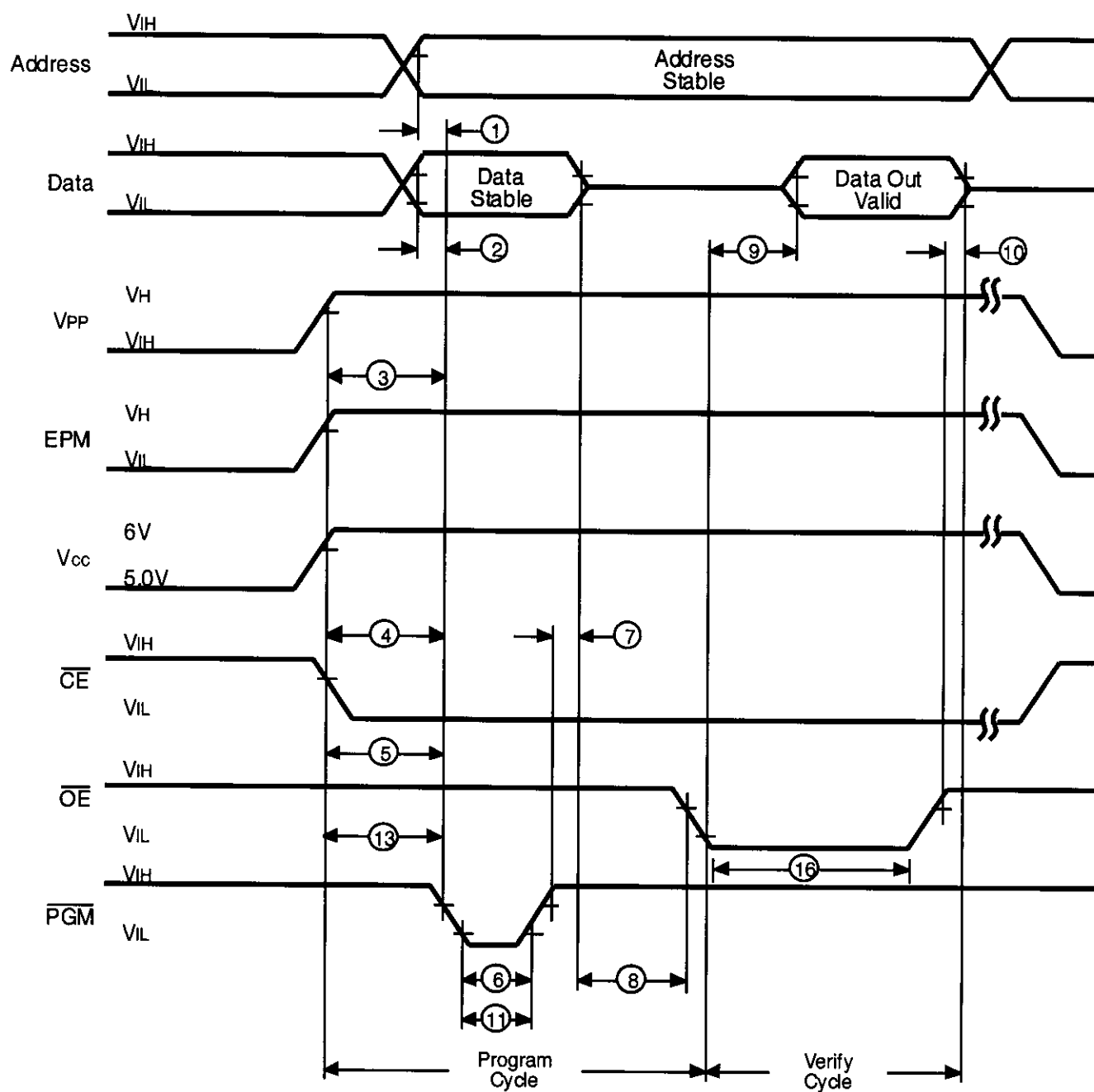


Figure 20. Z86E04/E08 Programming Waveform  
(Program and Verify)



# FUNCTIONAL DESCRIPTION (Continued)

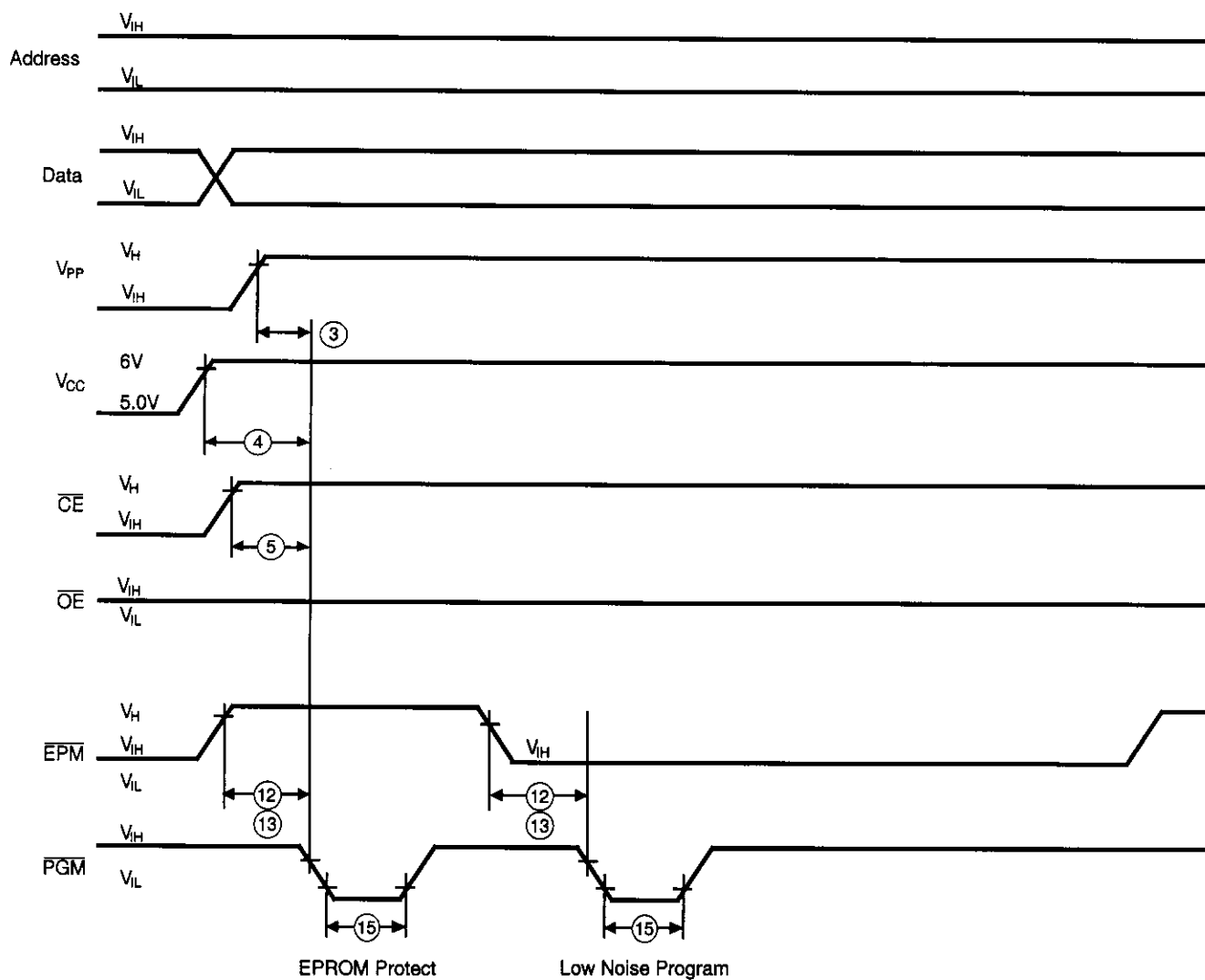
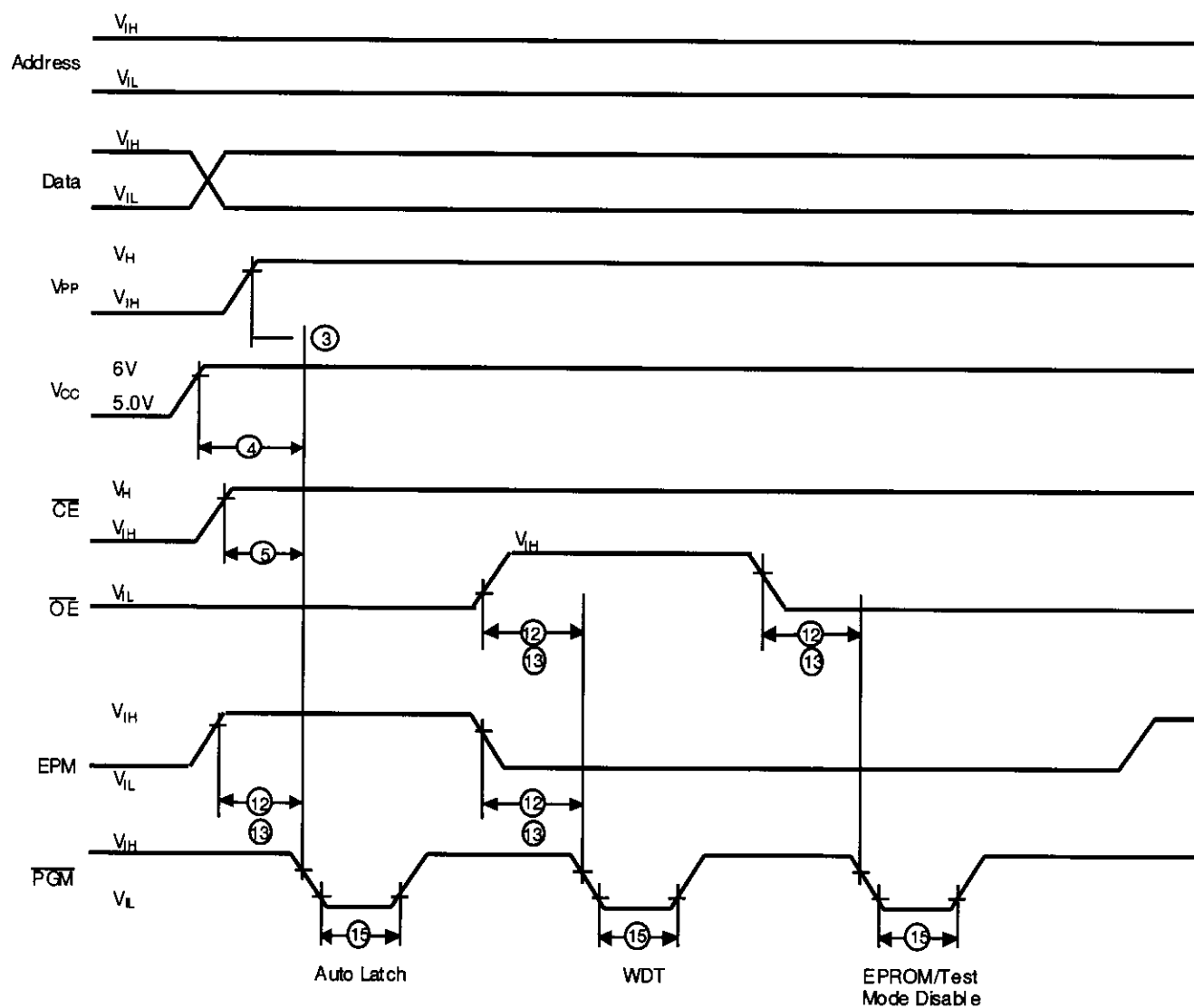


Figure 21. Z86E04/E08 Programming Options Waveform  
(EPROM Protect and Low Noise Program)



**Figure 22. Z86E04/E08 Programming Options Waveform  
(Auto Latch Disable, Permanent WDT Enable and  
EPROM/Test Mode Disable)**

# FUNCTIONAL DESCRIPTION (Continued)

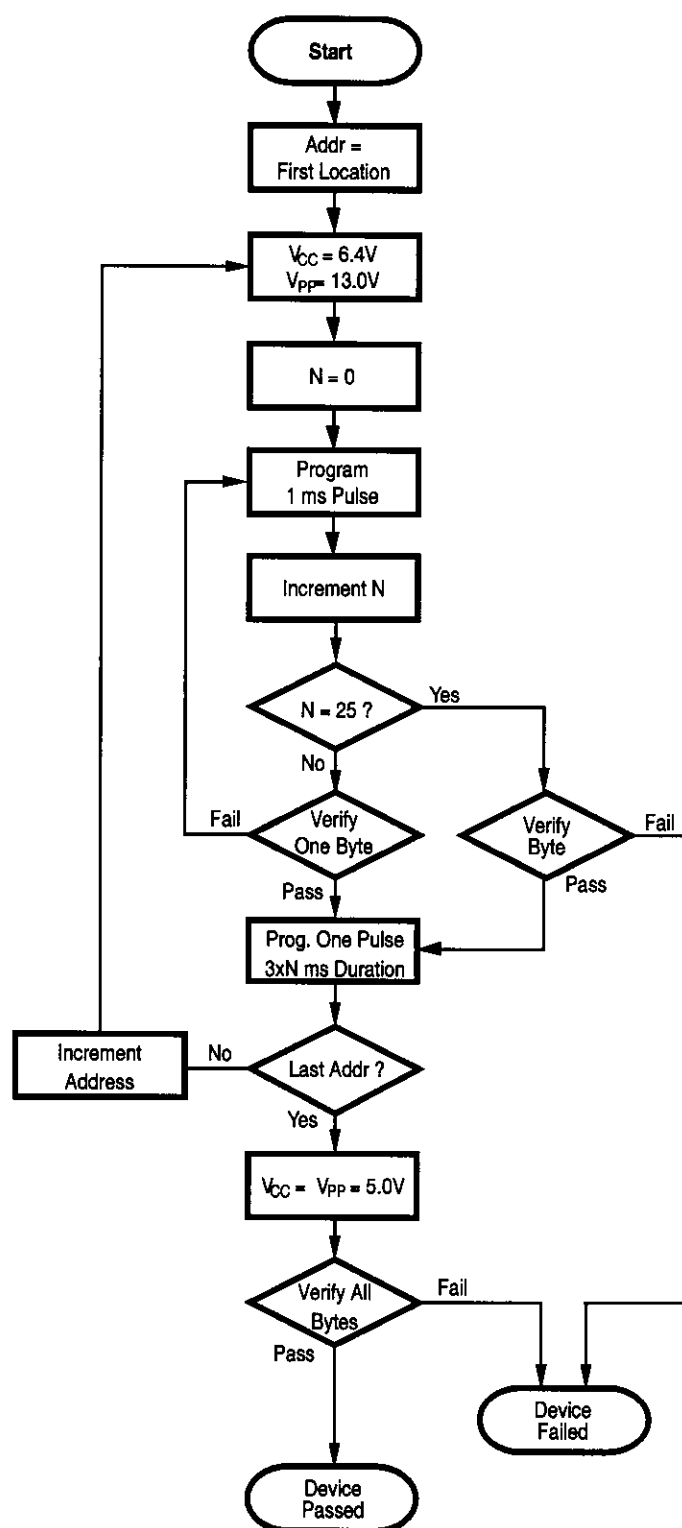


Figure 23. Z86E04/E08 Programming Algorithm

## Z8 CONTROL REGISTERS (Continued)

R248 P01M

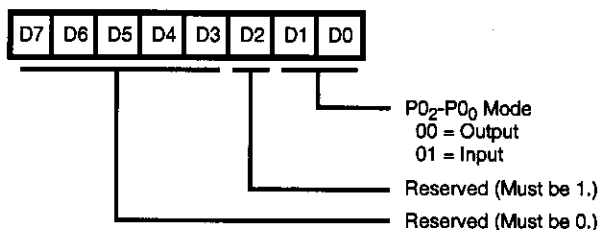


Figure 31. Port 0 and 1 Mode Register  
(F8<sub>H</sub>: Write Only)

R249 IPR

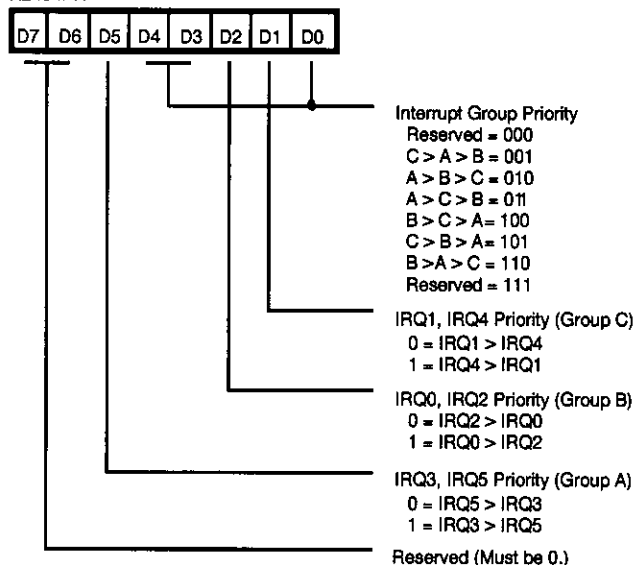


Figure 32. Interrupt Priority Register  
(F9<sub>H</sub>: Write Only)

R250 IRQ

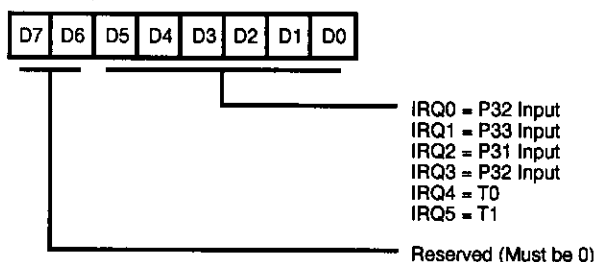


Figure 33. Interrupt Request Register  
(FA<sub>H</sub>: Read/Write)

R251 IMR

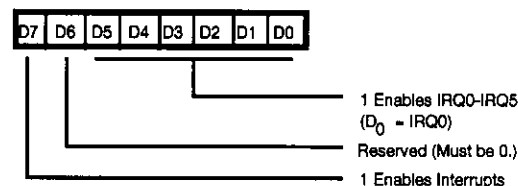


Figure 34. Interrupt Mask Register  
(FB<sub>H</sub>: Read/Write)

R252 Flags

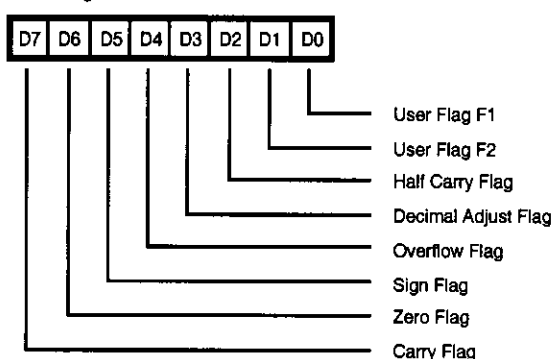


Figure 35. Flag Register  
(FC<sub>H</sub>: Read/Write)

R253 RP

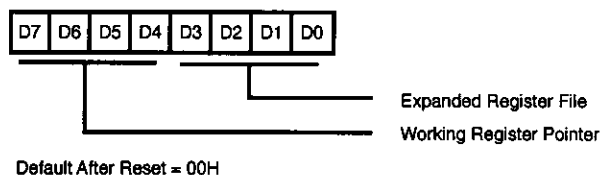


Figure 36. Register Pointer  
(FD<sub>H</sub>: Read/Write)

R255 SPL

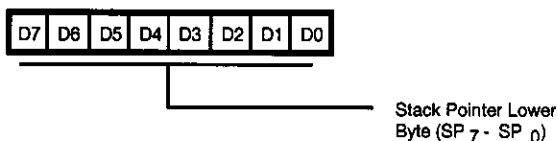


Figure 37. Stack Pointer  
(FF<sub>H</sub>: Read/Write)

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