CHAPTER 1
Z8® MCU PRODUCT OVERVIEW

1.1 Z8® MCU FAMILY OVERVIEW

The Zilog Z8 microcontroller product line continues to expand with new product introductions. Zilog MCU products are targeted for cost-sensitive, high-volume applications including consumer, automotive, security, and HVAC. It includes ROM-based products geared for high-volume production (where software is stable) and one-time programmable (OTP) equivalents for prototyping as well as volume production where time to market or code flexibility is critical (Table 1-1). A variety of packaging options are available including plastic DIP, SOIC, PLCC, and QFP.

A generalized Z8 MCU block diagram is shown in Figure 1-1. The same on-chip peripherals are used across the MCU product line with the primary differences being the amount of ROM/RAM, number of I/O lines present, and packaging/temperature ranges available. This allows code written for one MCU device to be easily ported to another family member.

1.1.1 Key Product Line Features

- **General-Purpose Register (GPR) File:** Every RAM register acts like an accumulator, speeding instruction execution and maximizing coding efficiency. Working register groups allow fast context switching.
- **Flexible I/O:** I/O byte, nibble, and/or bit programmable as inputs or outputs. Outputs are software programmable as open-drain or push-pull on a port basis. Inputs are Schmitt-triggered with auto latches to hold unused inputs at a known voltage state.
- **Analog Inputs:** Three input pins are software programmable as digital or analog inputs. When in the analog mode, two comparator inputs are provided with a common reference input. These inputs are ideal for a variety of common functions, including threshold level detection, analog-to-digital conversion, and short circuit detection. Each analog input provides a unique maskable interrupt input.
- **Timer/Counter(T/C):** The T/C consists of a programmable 6-bit prescaler and 8-bit downcounter, with maskable interrupt upon end-of-count. Software controls T/C load/start/stop, countdown read (at any time on the fly), and maskable end-of-count interrupt. Special functions available include T_{IN} (external counter input, external gate input, or external trigger input) and T_{OUT} (external access to timer output or the internal system clock.) These special functions allow accurate hardware input pulse measurement and output waveform generation.
- **Interrupts:** There are six vectored interrupt sources with software-programmable enable and priority for each of the six sources.
- **Watch-Dog Timer (WDT):** An internal WDT circuit is included as a fail-safe mechanism so that if software strays outside the bounds of normal operation, the WDT will timeout and reset the MCU. To maximize circuit robustness and reliability, the default WDT clock source is an internal RC circuit (isolated from the device clock source).
- **Auto Reset/Low-Voltage Protection:** All family devices have internal Power-On Reset. ROM devices add low-voltage protection. Low-voltage protection ensures the MCU is in a known state at all times (in active RUN mode or RESET) without external hardware (or a device reset pin).
- **Low-EMI Operation:** Mode is programmable via software or as a mask option. This new option provides for reduced radiated emission via clock and output drive circuit changes.

1.1 Z8® MCU FAMILY OVERVIEW (Continued)

- **Low-Power:** CMOS with two standby modes; STOP and HALT.
- **Full Z8 Instruction Set:** Forty-eight basic instructions, supported by six addressing modes with the ability to operate on bits, nibbles, bytes, and words.

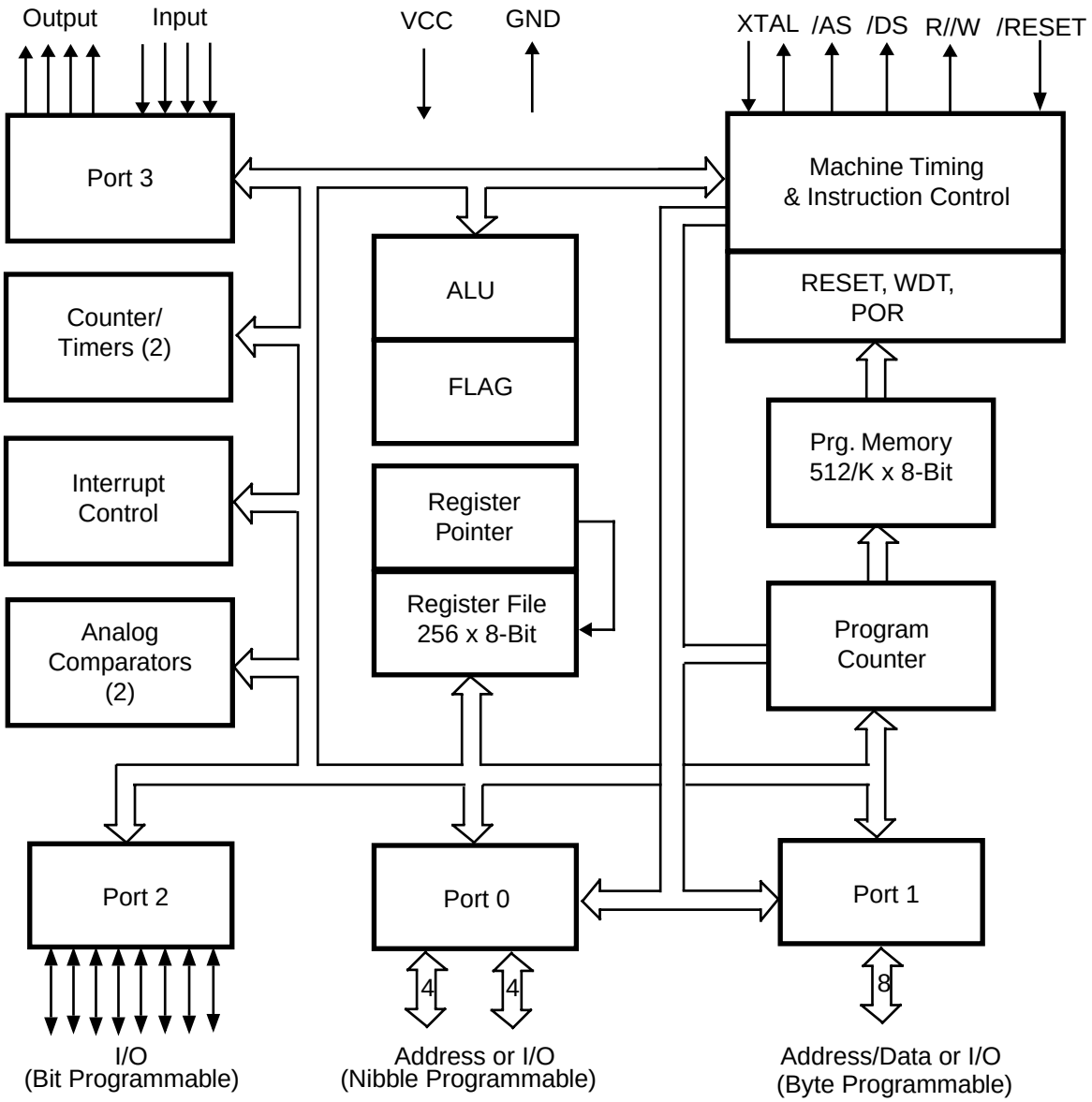

Figure 1-1. Z8® MCU Block Diagram

1.1.2 Product Development Support

The Z8® MCU product line is fully supported with a range of cross assemblers, C compilers, ICEBOX emulators, single and gang OTP/EPROM programmers, and software simulators.

The Z86CCP00ZEM low-cost Z8 CCP™ real-time emulator/programmer kit was designed specifically to support all the products outlined in Table 1-1.

Table 1-1. Zilog General-Purpose Microcontroller Product Family

PRODUCT	ROM/ RAM	I/0	T/C	AN IN	INT	WDT	POR	Vbo	RC	SPEED (MHz)	PIN COUNT
Z86C03	512/60	14	1	2	6	F	Y	Y	Y	8	18
Z86E03	512/60	14	1	2	6	F	Y	N	Y	8	18
Z86C04	1K/124	14	2	2	6	F	Y	Y	Y	8	18
Z86E04	1K/124	14	2	2	6	F	Y	N	Y	8	18
Z86C06	1K/124	14	2	2	6	P	Y	Y	Y	12	18
Z86E06	1K/124	14	2	2	6	P	Y	N	Y	12	18
Z86C08	2K/124	14	2	2	6	F	Y	Y	Y	12	18
Z86E08	2K/124	14	2	2	6	F	Y	N	Y	12	18
Z86C30	4K/236	24	2	2	6	P	Y	Y	Y	12	28
Z86E30	4K/236	24	2	2	6	P	Y	N	Y	12	28
Z86C31	2K/124	24	2	2	6	P	Y	Y	Y	8	28
Z86E31	2K/124	24	2	2	6	P	Y	N	Y	8	28
Z86C40	4K/236	32	2	2	6	P	Y	Y	Y	16	40/44
Z86E40	4K/236	32	2	2	6	P	Y	N	Y	16	40/44

Note: Z86Cxx signify Rom devices; 86xx signify EPROM devices; F = fixed; P = programmable

The Z86CCP00ZEM kit comes with:

- Z8 CCP Emulator/Programmer Module
- 18-pin Target Connection Cable
- WINDOWS-based GUI Host Software
- DOS-based ZASM LINKER/LOADER
- Documentation: Z8MOBJ Linker/Loader User's Guide, Z8 Cross Assembler User's Guide, Z8 Emulator GUI User's Guide, 8-Bit Microcontrollers Databook, and Z8 MCU Technical Manual.

A Z8 CCP Emulator Accessory Kit (Z8CCP00ZAC) is also available and provides an RS-232 cable and power cable along with the 28- and 40- pin ZIF sockets and 28 and 40 pin target connector cables required to emulate/program 28/40 pin devices.