Zilog, Inc., 210 E. Hacienda Ave., Campbell, CA 95008
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An innovator in the development, design, and manufacturing of application specific standard products (ASSPs) for the data communication, peripherals, and consumer product market.

Zilog's Z80® MPU Architecture Advances to the 3rd Generation

The Z80 microprocessor architecture continues to be used in many new and exciting applications; many of them unimaginable 25 years ago when Zilog first introduced the Z80. Over the years, Zilog has improved the architecture by providing increases in both CPU performance as well as address space. The Z80 architecture, with its dual register banks, enables fast context switching and interrupt handling, which makes it ideal for embedded control applications.

Generation #1: Introducing Three Cores

The three Z80 technologies, known as Z80®, Z180™, and Z380™, are code-compatible with increasing CPU performance and greater address capability. The original Z80 used 4 cycles/instr$_{MIN}$, addressed 64 KB and operated at 10 MHz. The Z180 and the static S180™ executes 3 cycles/instr$_{MIN}$. This gives the Z180 an immediate 33 percent performance increase compared to the Z80. The S180 increases the clock speed to 33 MHz and the address capability to 1 MB.

The Z380 fulfills the ever increasing demand for greater performance and additional address space. The Z380 core is a fully upward compatible 32-bit internal architecture. It further reduces the cycles/instr$_{MIN}$ to 2 and increases the linear addressing capability to 4 GB.

Four full 32-bit register banks have been included which makes the Z380 ideal for real-time multiprocessing applications. In all, the entire Z80 family is ideal for real-time, embedded controller applications.

Z80, Z180, Z382 Selection Guide

Focus Area	Typical Application Technology	Product Family
Serial Communications	Async	Z180, Z18X
	Sync, T1, E1 20 Mbps	Z85230, C30, Z16C30, C32
	Modem, ISDN	Z182, Z189, Z382
	Modem, ISDN, GSM	Z382
Embedded Control	General Purpose	Z84C15, Z18X
	Printer	Z180, Z181, Z185
	Fax	Z180, Z181, Z185
	Credit Card Readers/Modem	Z02201, Z02922, Z84C15, Z182
Remote Access	Fax	Z180, Z01701
	V.34 Modem	Z189, Z03400, Z89C50
	ISDN	Z182, Z382
	HDSL, ADSL, SDSL	Z182, Z382
Commodity	General Purpose Applications	NMOS, Z84CXX, X180, SCC
	Military	

Generation #2: Z180 Microprocessor Family

After identifying a specific market, Zilog uses Superintegration™ technology to surround each CPU core with the applicable advanced peripherals. All Z180 family members contain the S180 core. This core contains the processor as well as peripherals shown in Figure 1.

The Z80182 typifies the Z180 family. The additional peripherals include two complete USART channels (Z85230 ESCC) and a 16550 interface to drive an ISA bus directly. The Z189 adds parallel I/O capability to the S180.

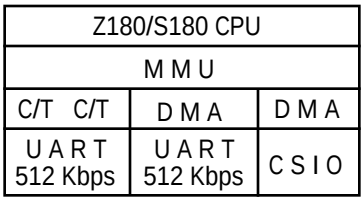

Figure 1. Z180/S180

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Generation #2: Z180 Microprocessor Family *(Continued)*

The Z80185, typically used in applications where parallel and serial interfaces are required, is the latest Z180 family member. It provides a complete USART channel (Z85233 ESCC), a bidirectional IEEE 1284 port, and 32 KB ROM on chip. The Z80195 is the ROM-less version. The Z185/Z195 has been used in scanners, data communications equipment, and industrial controllers. The Z180 family, summarized in the table below, provides an excellent, cost-effective solution to many different types of applications.

Features of the Z180 Family

	S180	Z181	Z182	Z185/195	Z189
Z180 Core	6 to 33 MHz	10 MHz @ 5V	33 MHz @ 5V	33 MHz @ 5V	33 MHz @ 5V
Temperature	0° to 70°C	0° to 70°C	0° to 70°C	0° to 70°C	0° to 70°C
MMU	Yes	Yes	Yes	Yes	Yes
DMA	2	2	2	2	2
UART	2	2	2	2	2
CSIO	1	1	1	1	1
Counter Timers	2 (16-bit)	2 (16-bit)	2 (16-bit)	2 (16-bit)	2 (16-bit)
HDLC (USART)	–	SCC (2 ch)	ESCC (2 ch)	ESCC (2 ch)	–
ROM	–	–	–	32 KB	–
16550 MIMIC	–	–	Yes	–	Yes
IEEE 1284 Port	–	–	–	–	Yes
Parallel I/O	–	16	24	24	24
Power Down Modes	Yes	–	Yes	Yes	Yes
Programmable EMI	Yes	–	Yes	Yes	Yes
Comm Port Decode	–	–	–	–	Yes

Generation #3: Z382 High-Performance Data Communications Controller

The Z382 is a 16/32 bit product architected for high-performance embedded data communication applications. The Z382 integrates the high-performance Z380 microprocessor with three 10 Mbps full-duplex HDLC channels. The Z382 is ideal as a baseband controller for analog, ISDN, and xDSL applications. The CGI/IOM-2 ports provide an easy interface for ISDN applications. Host interfaces include ISA, Plug-and-Play, and PCMCIA.

Zilog provides a comprehensive library of user manuals, technical specifications, and application notes. We offer evaluation boards for all Z80/Z180/Z380 products to enable quick application development.

Numerous third-party hardware and software vendors, recognizing the tremendous acceptance of the Z80 architecture, have developed an array of development tools for Z80 family products.

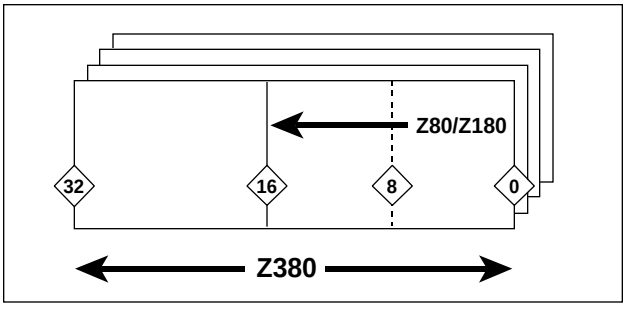

Figure 2. Z80 Family Register Sets