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ZT 8908

Single Board Computer with Pentium® Processor or AMD-K6™

An advanced STD 32® computer with support for multiprocessing and CompactPCI® expansion.

The ZT 8908 is a single board Pentium® processor-based computer, based on the Intel 430TX PCIset, that offers outstanding performance in a very small form factor. The Pentium processor, the 32-bit STD 32® backplane, and PCI expansion capability give the ZT 8908 features formerly found only on larger format solutions.

A local PCI mezzanine bus provides support for high-speed peripherals such as Super VGA. The PCI capability and an optional IDE interface allow the ZT 8908 to operate as a complete embedded PC.

The ZT 8908 is PC/AT-compatible, and with Ziatech's Industrial BIOS, supports Microsoft® MS-DOS, Windows 95, and Windows NT®. It will also run VxWorks, QNX, UNIX, and other operating systems.

The ZT 8908 contains a large RAM capacity via industry standard DRAM modules, and provides on-board flash memory for embedded programs. Its high-speed STD 32 Bus interface provides access to STD 32 and STD peripherals and I/O cards.

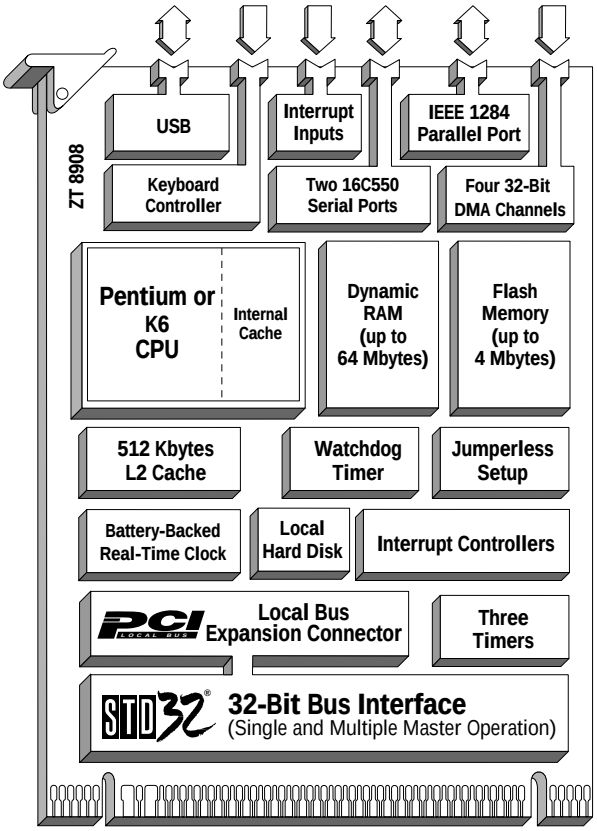
The STD 32 interface also supports multiple processors in the same system, allowing the ZT 8908 to operate in Ziatech's multiprocessing STD 32 STAR SYSTEM™.

The ZT 8908 can be used in new designs or as a functional replacement for the ZT 8905 Single Board Pentium Computer



- STD 32 multiprocessing-capable
- PC/AT software-compatible
- MS-DOS in flash
- 133 MHz Pentium or 233 MHz Pentium processor with MMX technology; or 200 or 233 MHZ AMD-K6 MMX Enhanced processor
- Intel 430TX PCIset
- CompactPCI local bus expansion
- 16 to 64 Mbytes DRAM
- Two or four Mbytes of flash memory
- 512 Kbytes L2 cache
- Integrated IDE drive option
- IEEE 1284 parallel port (Centronics, ECP, EPP)
- PC/AT keyboard controller
- Two RS-232 serial ports (16550)
- One Universal Serial Bus (USB) port
- Four DMA channels (8237)
- Real-time clock, with battery backup
- Watchdog timer
- Push-button reset
- Software-programmable LED
- Jumperless system setup
- Dynamic 8-, 16- and 32-bit bus sizing
- 32-bit high-speed STD 32 Bus interface
- One PS/2 mouse port

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Functional Considerations

STD 32 Bus Interface

The ZT 8908 Single Board Computer with Pentium Processor or AMD-K6 is designed for the STD 32 Bus architecture. Dynamic detection of backplane peripheral capabilities allows the ZT 8908 to support high-speed 8-, 16- and 32-bit Extended Architecture (EA) boards as well as slower 8- and 16-bit Standard Architecture (SA) boards. SA capability ensures compatibility with existing 8-bit STD-80 I/O boards.

Multiprocessing Operation

The ZT 8908 can be configured for multiprocessing in an STD 32 STAR SYSTEM. Up to seven STD 32 processors can share resources in one STD 32 backplane, with common memory and I/O peripherals. The onboard PCI capability of the ZT 8908 allows fast local I/O, such as Super VGA, to run independently of the STD 32 backplane. (See the STD 32 STAR SYSTEM data sheet in the Multiprocessing section of Ziatech's Technical Data Book for detailed information.)

Intel and AMD Processor Options

The ZT 8908 takes advantage of the latest Intel and AMD processor technologies to offer unmatched computing power for the industrial OEM. The ZT 8908 supports 133 MHz and 233 MHz Pentium processors with MMX technology. In addition, the ZT 8908 also supports the AMD K6 processor (200 and 233 MHz).

3.3V Technology

The ZT 8908 makes use of 3.3V technology to minimize the amount of system power required for high-performance computing. The Pentium processor or AMD-K6 and DRAM subsystem operate from 3.3V power, which is provided by an onboard high-efficiency DC to DC converter.

Cooling Requirements

An integrated heat sink and fan is provided to cool the processor. Contact Ziatech for maximum operating temperatures for different speed ZT 8908 Single Board Computers.

Dynamic RAM Locations

The ZT 8908 includes two 72-pin SO-DIMM DRAM socket locations that can accommodate up to 64 Mbytes of local memory. Additional memory can be accessed via the onboard PCI bus or through the STD 32 backplane.

Flash Memory BIOS/Disk

Up to four Mbytes of flash memory can be loaded on the ZT 8908. The flash memory contains the system BIOS as well as solid state disk capabilities. Making use of the latest in flash technology, the ZT 8908 provides true 5V-only operation for all flash accesses.

Cache Memory

The Pentium processor or AMD-K6 contains 16 to 32 Kbytes of internal Level 1 (L1) cache memory depending on processor type. In addition, the ZT 8908 includes a 512 Kbyte Level 2 (L2) cache.

I/O Addressing

I/O is supported via onboard peripherals, PCI expansion, and/or backplane peripheral boards. High-speed STD 32 boards and older 8-bit STD boards are supported with 16-bit addressing. The STD bus signal IOEXP is also driven dynamically to allow older 8-bit addressed peripherals from being redundantly mapped in the I/O space.

CompactPCI Expansion Interface

The Peripheral Component Interconnect (PCI) protocol is provided as local bus expansion for the ZT 8908. This is designed to comply with the CompactPCI open specification for small form factor and mezzanine cards. The ZT 8908 supports local bus VGA and other PCI peripherals. PCI local bus operation provides dramatically faster video performance than video boards operating at ISA bus speeds.

Jumperless Setup

The setup for onboard interrupt routing, DMA routing and other features is configurable under software control. This feature dynamically reconfigures resources as needed.

Serial I/O

Two 16C550-compatible UARTS are provided on the ZT 8908. Configured as COM1 and COM2, these RS-232 serial channels provide complete PC/AT-compatibility, including modem control signals, hand-

shaking, interrupt support, and data rates up to 115K baud. The onboard serial line drivers require only 5V power supply operation, using charge pump technology to create RS-232-compatible signals. The two serial channel interfaces are provided through the multi-I/O connector.

Universal Serial Bus (USB)

One USB port is provided on the ZT 8908. A single type A USB port is provided to interface to new keyboards, and other I/O communication devices.

IEEE 1284 Parallel Port

The ZT 8908 includes an IEEE 1284-compliant parallel port. This is a Centronics-compatible printer port with Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP). The enhancements and extensions allow the use of high-speed, non-printing devices on the parallel port with or without DMA. Bidirectional control is available via software. The parallel port interface is provided through the multi-I/O connector.

Interrupts

A fully PC/AT-compatible interrupt subsystem supports a total of 15 discrete interrupt inputs for the ZT 8908. Interrupt sources include a mixture of onboard, STD Bus, frontplane, and PCI peripherals. The PCI interface supports shareable interrupt levels.

PC/AT-Compatible Timers

Three independent, 16-bit timers (8254 architecture) are available. An interrupt can be generated on end-of-count events.

Direct Memory Access

Direct Memory Access (DMA) channels are provided by an onboard 32-bit controller that is a superset of the 8237 PC/AT-compatible controller. Each channel is programmable for 8- or 16-bit operation, and supports fast (TYPE F) compatible transfers. DMA through backplane control signals is supported by the ZT 8908. One channel is available through the BUSRQ*/BUSAK* handshake. Three additional channels are available through the frontplane interface.

Hard Disk Interface

The ZT 8908 supports a local integrated IDE hard disk interface as an option. This drive mounted on the ZT 8908 is independent of backplane-based hard disk interfaces, allowing the ZT 8908 to boot from a local operating system. In multiprocessing applications, this feature can be used to allow each CPU to boot different operating systems, and also frees-up the STD 32 Bus for other I/O.

Watchdog Timer

An onboard watchdog timer is provided for system integrity. When enabled, the watchdog must be strobed within 500ms to avoid a system reset.

Real-Time Clock

The real-time clock is compatible with the industry standard Motorola MC 146818A architecture. Features include 12- or 24-hour timekeeping, leap year adjustment, rollover status, time comparison and periodic interrupt generation. Data retention for system setup functions is provided by an onboard battery.

Keyboard Interface

The ZT 8908 includes an onboard keyboard controller that is fully PC/AT-compatible, and is provided through the multi-I/O connector.

Software

The ZT 8908 comes standard with Ziatech's industrial BIOS and MS-DOS in flash EPROM. The BIOS can boot from the operating system residing in local flash memory, from a local flash drive, from a floppy or hard disk, or from another computer via a network. The flexibility of the BIOS allows the ZT 8908 to operate like a PC in a broad range of configurations, including a minimal feature set without any other peripherals. A setup program built into the BIOS allows for configuration of other peripherals, the boot source, diagnostics and other system parameters.

In the multiprocessing STAR SYSTEM, the STAR BIOS also manages interprocessor communication and access to shared peripherals.

Development toolkits are strongly recommended for the initial purchase. These toolkits contain utilities and tools that speed the development process and help with technical support. Toolkits are available for single or multiple processor DOS, QNX or Windows NT based-systems. A toolkit and BSP is available for VxWorks. Some of these tools are applicable to other operating systems. Contact Ziatech for more details.

ZT 8905 Compatibility

The ZT 8908 supersedes the ZT 8905 Single Board Computer with compatible features. Previous ZT 8905 customers should contact Ziatech for a detailed technical comparison.

Specifications

- Electrically and mechanically compatible with STD 32 Specification, version 1.3
- Electrically compatible with PCI Specification, version 2.1

Electrical

Power Req.	***Min.***	***Typ.***	***Max.***
Supply Voltage, +12V	—	—	—
Supply Voltage, V_{CC}	4.75V	5.00V	5.25V
Supply Current, V_{CC}=5.0V ***(133 MHz)***	—	TBD	TBD
Supply Current, V_{CC}=5.0V ***(233 MHz)***	—	TBD	TBD
AMD-K6 Supply Current, V_{CC}=5.0V ***(200 MHz)***	—	TBD	TBD
AMD-K6 Supply Current, V_{CC}=5.0V ***(233 MHz)***	—	TBD	TBD

Mechanical

- Measures 4.5" (11.4cm) x 6.5" (16.5cm)
- Requires two STD 32 slots

- Maximum component height:
  Top surface: 1" (2.5cm) with forced-air cooling heat sink; two STD slots
  Bottom surface: 0.047" (1.2mm)
- Weight: 7.5 oz. (212.6g)
- Connectors
  - P1: 136-pin, edge finger STD 32 interface connector
  - J2: Fan
  - J3: Speaker interface
  - J4: 68-pin latching connector, multi-I/O interface supporting 2 COM ports, parallel port, VGA interface, keyboard, and frontplane interrupts/ DMA
  - J5: 125-pin, 2mm style, local bus PCI interface
  - J6: 10-pin frontplane interrupt
  - J7: 10-pin frontplane DMA
  - J8: 44-pin, 2mm header, optional IDE hard disk interface
  - J10: 16-pin, 2mm header, VGA transition connector

STD 32 Compliance Levels

See the STD 32 brochure in the appendix of the Technical Data Book for more details regarding STD 32 Compliance Level descriptions.

- Permanent Master: EA32, EA16, EA8, SA16, SA8-I, MX
- Temporary Master: EA32, EA16, EA8, SA16, SA8-I, MX

Environmental	
Operating Temperature	0˚ to 55˚ Celsius (Preliminary)
Storage Temperature	-40˚ to +85˚ Celsius
Non-Condensing Relative Humidity	less than 95% at 40˚ Celsius

Reliability

MTBF: TBD
MTTR: five minutes (based on board replacement)

Ordering Information

ZT 8908	Single Board Computer with Pentium Processor or AMD-K6
ZT M8908	ZT 8908 manual

Must choose one option from each category:

CPU options

C1	133 MHz Pentium processor
C2	233 MHz Pentium processor with MMX technology
C3	200 MHz AMD-K6 with MMX Enhanced Processor
C4	233 MHz AMD-K6 with MMX Enhanced Processor

RAM options

R1	16 Mbytes DRAM, installed
R2	32 Mbytes DRAM, installed
R3	64 Mbytes DRAM, installed

Flash memory options

P1	2 Mbytes flash memory, installed
P2	4 Mbytes flash memory, installed

Software options

S1	MS-DOS and Ziatech's Industrial BIOS installed in flash memory
S2	MS-DOS and Ziatech's STAR BIOS installed in flash memory for multiprocessing systems
S3	STAR QNX boot ROM and Ziatech's STAR BIOS installed in flash memory (temporary masters only)
S4	Microsoft Windows NT and Ziatech's Industrial BIOS installed (requires hard disk in the system)

Select from the following options as needed:

IDE options

Dx	Integrated IDE drive installed. Contact Ziatech for ordering option (x) and associated capacity. (requires one extra slot)

Video and CompactPCI local bus options

V1	CompactPCI local bus Super VGA Adapter with 2 Mbytes video RAM (zPM11-2)
V2	CompactPCI local bus Super VGA Adapter with 4 Mbytes video RAM (zPM11-4)
V3	CompactPCI local bus Super VGA/Flat Panel Adapter with 2 Mbytes video RAM (zPM12-2)
V4	CompactPCI local bus Super VGA/Flat Panel Adapter with 4 Mbytes video RAM (zPM12-4)
V5	CompactPCI local bus Ethernet Adapter (zPM15)

STAR SYSTEM options

M1	Permanent master (requires option S2)
M2	Temporary master (requires option S2 or S3)

Development Toolkit options (for first purchase):

ZT 94058 STD DOS Development Toolkit; Includes host development disk, BIOS system manual, STD DDP (Device Driver Package), ZT 90243 transition cable, and printed and on-line documentation for all boards ordered in the development system.

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ZT 94059 STD QNX Development Toolkit (QNX purchased separately); Includes host development disk, BIOS system manual, QNX DDP (Device Driver Package), ZT 90243 transition cable, ZT 95207 boot ROM and printed and on-line documentation for all boards ordered in the development system.

ZT 94060 STD Windows NT Development Toolkit; Includes host development disk, BIOS system manual, Microsoft Windows NT Workstation v4.0, DDP for Windows NT, ZT 90243 transistion cable, and all printed and on-line manuals for all boards ordered in development system.

ZT 94061 STD VxWorks Development Toolkit (VxWorks purchased separately); Includes ZT 8908 VxWorks BSP, host development disk, BIOS system manual, STD DDP (Device Driver Package), ZT 90243 transition cable, ZT 95207 boot ROM and printed and on-line documentation for all boards ordered in the development system.

Accessories

Cable *(see Data Book cable section for details):*

ZT 90243 11" (25.4cm) 68-pin transition cable to the following connectors:

- Two 9-pin male D-shell COM interfaces
- One 25-pin female D-shell parallel port interface
- One 15-pin female D-shell VGA interface
- One 4-pin female Type A USB interface
- One 6-pin mini DIN PS/2 mouse interface
- One 5-pin female DIN keyboard interface

ZT 95207 Boot ROM with BIOS and MS-DOS for reinstalling ZT 8908 on-board firmware

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